The US Army's Center for Strategy and Force Evaluation

STUDY REPORT
CAA-SR-93-14

(1)

EQUITABILITY OF TREATMENT IN ARMY JUDICIAL PROCEEDINGS (ETAJUP)

DECEMBER 1993

PREPARED BY
FORCE SYSTEMS DIRECTORATE

US ARMY CONCEPTS ANALYSIS AGENCY
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13 ABSTRACT (Maximum 200 words)

Army court-martial case data from the US Army Judiciary Clerk of Court was analyzed to assess whether minority soldiers are treated as equitably as White soldiers. The study considered court-martial proceedings, Armywide, over the period FY 1987-1992, limited to cases involving Black and White enlisted personnel. The court-martial trial process and the soldier offenders were characterized by data elements from the case data. The data was analyzed using cross-tabulation and discriminant analysis methods. The work found that: (1) pairwise differences in treatment generated by cross-tabulation of trial process factors with race range from less than 1 percent to a maximum of 13.6 percent and are not consistently associated with either race; (2) models used in the discriminant method employing sets of factors at a time as predictors of group membership did not robustly predict a group membership, and suggest that the trial process, as characterized by these factors, is not sensitive to race. The overall analysis of the data indicates, on balance, no evidence of inequitable treatment of Black offenders within the Army judicial system.

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REPLY TO
ATTENTION OF:

CSCA-RSR (5-5d)

12 OCT 1994

MEMORANDUM FOR Deputy Chief of Staff for Personnel, ATTN: DAPE-HR, Headquarters, Department of the Army, Washington, DC 20310-0300

SUBJECT: Equitability of Treatment in Army Judicial Proceedings (ETAJUP) Final Report

1. *Reference: Request for Analytical Support, SAB, 9 Feb 1993.*

2. Reference document requested the US Army Concepts Analysis Agency (CAA) to determine if the Army judicial (court-martial) proceedings treat both Black and White enlisted personnel equally.

3. The enclosed report documents the results of our analysis. The executive summary, found in the report, provides an overview of the entire study.

4. CAA expresses appreciation to the Clerk of Court, US Army Judiciary for making available the case report data used in the analysis. Questions and/or inquiries should be directed to the Resource Analysis Division, US Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, MD 20814-2797, DSN 295-5289.

E. B. Vandiver

Encl

E. B. VANDIVER III
Director

CAA	**EQUITABILITY OF TREATMENT IN ARMY JUDICIAL PROCEEDINGS (ETAJUP)**	**STUDY SUMMARY CAA-SR-93-14**

THE REASON FOR PERFORMING THE STUDY was concern expressed outside the Army that minorities are disproportionately represented in the Army's justice system, leading to questions about whether or not the Army administers justice equitably.

THE STUDY SPONSOR was the Office of the Deputy Chief of Staff for Personnel, Director of Human Resources (DAPE-HR).

THE STUDY OBJECTIVES were to:

(1) Assess whether minority soldiers are treated as equitably as White soldiers using official court-martial case report data.

(2) Identify any specific factors in the court-martial data which could imply nonequitable treatment.

THE SCOPE OF THE STUDY was court-martial proceedings, Armywide, over a multiyear period (fiscal years (FY) 87-92) and was limited to cases involving Black and White enlisted soldiers.

THE MAIN ASSUMPTION/LIMITATION of the study is the focus on the Army's formal judicial process, the court-martial. The issue of equitableness of treatment within this trial process is a crucial concern in responding to the issue of overrepresentation. However, this focus does not consider other, possibly relevant, considerations which may exist pretrial; to include enforcement activities and aspects of individual behaviors, which may fall along racial lines. However, data to characterize these pretrial conditions for analysis are not available on an authoritative or systematic basis.

THE BASIC APPROACHES used in this study were to:

(1) Identify and collect the case data from the US Army Judiciary Clerk of Court, Court-martial Case Records (CMCR) data base.

(2) Select elements of data to characterize both the court-martial process and the soldier offenders.

(3) Analyze the data using statistical methods appropriate to detecting differences in treatment by race of the offender.

(4) Interpret the statistics to determine if differences in treatment are present and whether, on balance, the court-martial process administers justice equitably.

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

(1) Maximum differences in treatment analyzed by the pairing of 11 factors characterizing the trial process with the race of the offender are small, and not consistently associated with a single race.

(2) Statistical models considering multiple factors at a time failed to robustly predict the group membership of offenders and suggest that the trial process, as characterized by these factors, is not sensitive to racial group.

(3) The overall analysis of the data from the Clerk of Court indicates, on balance, no evidence of inequitable treatment of Black offenders within the Army judicial system.

THE STUDY EFFORT was directed by Mr. James J. Connelly, Force Systems Directorate, US Army Concepts Analysis Agency.

COMMENTS AND QUESTIONS may be sent to the Director, US Army Concepts Analysis Agency (CAA), ATTN: CSCA-FSLP, 8120 Woodmont Avenue, Bethesda, Maryland 20814-2797.

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EQUITABILITY OF TREATMENT IN ARMY JUDICIAL PROCEEDINGS (ETAJUP)

CHAPTER 1

EXECUTIVE SUMMARY

1-1. PROBLEM. Concern has been expressed that minorities are disproportionally represented in the Army's justice system, leading to questions about whether or not the Army administers justice equitably.

1-2. BACKGROUND. Data from the Clerk of Court and Disciplinary Barracks (Fort Leavenworth) show that the proportion of minority offenders in the Army justice system significantly exceeds the proportion of minority soldiers in the Army. While this overrepresentation is even more pronounced in the civilian sector, the Army is a selective environment where recruits must meet certain entry requirements, with the expectation that this would result in a pattern of offenses generally matched across ethnic groups.

1-3. PURPOSE OF STUDY. Through an analysis of available data, provide a statistically-based understanding of the conditions which characterize involvement in the judicial process, which may possibly provide insights to remedy the problem of overrepresentation.

1-4. OBJECTIVES OF STUDY. Based on official courts-martial data, (1) assess whether minority soldiers are treated as equitably as White soldiers in court-martial proceedings and (2) identify any specific factors in the data which could imply nonequitable treatment.

1-5. SCOPE OF STUDY. The study considered court-martial proceedings, Armywide, over a multiyear period (fiscal years (FY) 87-92) involving minorities and White enlisted personnel. Given that a case will generally involve more than one charge, the impact of individual charges was considered as well as the overall case disposition.

1-6. ASSUMPTIONS/LIMITATIONS

a. The study is focused on the Army's formal judicial process, the court-martial; Article 15s and summary courts-martial were excluded. The issue of equitableness of treatment within this trial process is a crucial concern in responding to the issue of overrepresentation. However, this focus does not consider other, possibly relevant, considerations which may exist pretrial--to include enforcement activities and aspects of individual behavior which may fall along racial lines. However, data to characterize these pretrial conditions for analysis are not available on an authoritative or systematic basis.

b. As part of the examination of the data, the percentages of White, Black, and other minority offenders in the justice system were compared with corresponding percentages for the Army enlisted population. These percentages confirmed the overrepresentation of Blacks, but not other minorities, in the system. Based on this finding, and with the sponsor's approval, further analysis was limited to the Black versus White enlisted offenders.

c. A typical court-martial involves multiple offenses and a single punishment for all the charges found. This situation, in general, precludes evaluation of the trial outcomes for individual offenses and raises the question of characterizing the offenses for analysis purposes. To deal with this situation, the offenses in the Uniform Code of Military Justice (UCMJ) were characterized into one of five categories: crimes against military order, general order, persons, property, and those involving substances. For each case, the charge with the longest maximum sentence was identified and used to characterize the nature of the crime for analysis purposes. The case was further characterized by a count of the number of offenses charged and the total maximum time faced for all the offenses charged.

1-7. TIMEFRAME. Court-martial case data from the US Army Clerk of Court for the period from FY 1987 to FY 1992.

1-8. APPROACH

a. System Model. The assessment of equitability of the judicial proceedings was carried out using a systems formulation of the court-martial process. In this formulation, the process is represented, in phases, as an input-process-output model (Figure 1-1(a)). The input takes the form of the nature of the charges brought (trial charge phase), the process takes the form of the arrangements surrounding the conduct of the trial (trial activity phase), and the output takes the form of the court's actions in meting out punishment (trial outcome phase).

b. System Evaluation Factors. The system is evaluated using selected factors (Figure 1-1(b)) from the court-martial case records to examine each of the phases of the trial process. The levels of the factors across race are compared and expressed as percentage differences between Black and White offenders. In an idealized social context, there would be minimal differences in these levels across race. As the context becomes less idealized, the number and magnitude of the differences would increase. These measures, partitioned by race, are also employed to predict racial group membership. In addition to the direct comparison of factor levels across race, the comparisons are also controlled for selected characteristics of the offenders (Figure 1-1(c)). These control factors were selected to reflect both the soldier as an individual and the soldier's Army experience.

c. System Equitability. The equitability of the system is determined by a judgment which collectively assesses the significance of the differences in the system evaluation measures and their ability to predict racial group menbership.

1-9. METHODOLOGY. The study activity was organized into four tasks.

a. Task 1 - Data Acquisition and Consolidation. Case data from the US Army Clerk of Court Court-martial Case Records (CMCR) data base were examined to identify factors which could be used to characterize both the court-martial process and the enlisted personnel accused of offenses.

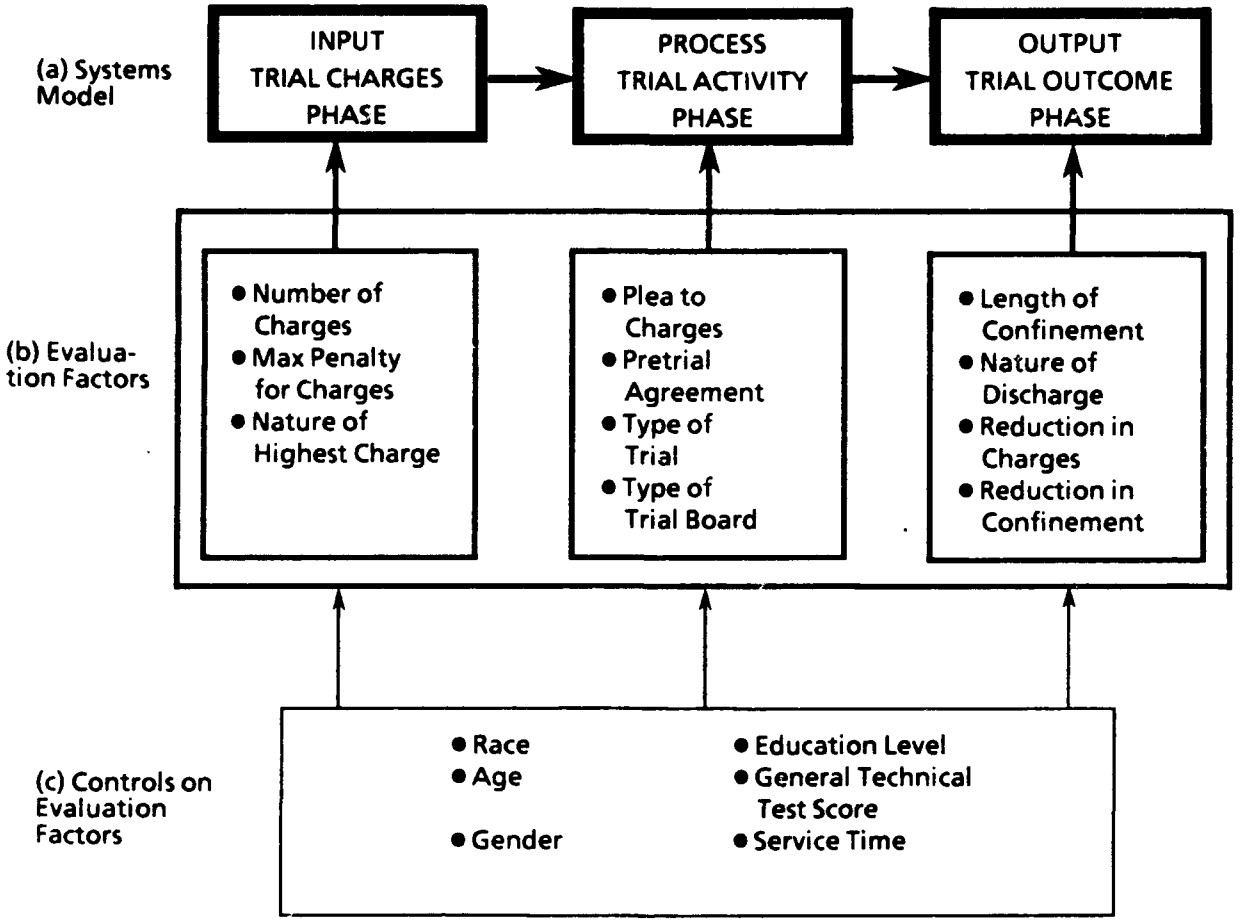

Figure 1-1. Systems Model of Trial Process

b. Task 2 - Factor Identification. The court-martial proceedings were characterized as a process consisting of three phases: trial charges, trial activity, and trial outcome. Appropriate CMCR data base factors were then associated with each phase of the process. The enlisted soldiers accused of offenses were also characterized by factors drawn from the CMCR data base.

c. Task 3 - Factor Analysis. The data variations in the factors (variables) were evaluated using two separate, but complementary, methods of analysis.

(1) Factor-pair Analysis. Cross-tabulation was used to explore successive pairing of the process and soldier variables to detect any differential in treatment.

(2) Factor-set Analysis. Discriminant analysis and a related tree-structure classification method were used to examine all the process and soldier variables simultaneously in models estimating the contribution of the variables to prediction of the race of the accused.

d. Task 4 - Assessment of Differences in Treatment. The results of the analyses were interpreted to identify factors associated with the differences in treatment across race.

1-10. ESSENTIAL ELEMENTS OF ANALYSIS

a. What case-related and other factors should be used to characterize the court-martial proceedings to facilitate recognition of any differences in treatment? The study identified 11 factors in the CMCR data base associated with the trial process (Figure 1-1(b)), and 6 factors associated with the soldier offender (Figure 1-1(c)), that were considered to be potentially sensitive to differences in treatment. The case data for the factors was systematically extracted from the CMCR data base and reformatted for use in the analysis.

b. Are there any differences in the treatment of offenders by race in the court-martial proceedings? The evaluation determined the following treatment-sensitivities for each of the trial phases:

(1) Trial Charges Phase

- **Number of Charges.** Black offenders are more often accused with eight or more charges (by 1.3 percent) than White offenders. White offenders are more often accused with five to seven charges (by 0.5 percent) than Black offenders.

- **Time Faced on Charges.** Black offenders more often face time on charges of 5-10 years (by 1.5 percent) than White offenders. White offenders more often face time on charges of 20-25 years (by 1.8 percent) than Black offenders

- **Nature of Highest Charge.** Black offenders are more often accused of crimes involving persons (by 4.5 percent), and to a lesser extent in crimes against property (by 1.9 percent) and substances (by 1.8 percent). White offenders are more often accused of crimes against military order (by 4.2 percent) and general order (by 4.1 percent) than Black offenders.

(2) Trial Activity Phase

- **Plea to Charges.** White offenders enter a plea of guilty more often (by 13.6 percent) than Black offenders. Black offenders, reciprocally, enter a plea of not guilty more often (by 13.0 percent) than White offenders.

- **Pretrial Agreement.** Black offenders are less involved in pretrial agreement (by 13.3 percent) than White offenders. This disposition to forego a pretrial agreement is consistent with the disposition to the not guilty plea (above).

- **Type of Trial.** Black offenders more often face a special court-martial (by 2.0 percent) than White offenders. White offenders more often face a general court-martial (by 1.2 percent) than Black offenders.

- **Type of Trial Board.** Black offenders more often request participation of enlisted personnel on the trial board (by 6.4 percent) than White offenders.

(3) Trial Outcome Phase

- **Length of Confinement.** About half (46 percent) of all confinements are either suspended or last less than 6 months. Of these, Black offenders more often receive suspended sentences (by 6.6 percent) than White offenders. White offenders, as a consequence, receive sentences of less than 6 months more often (4.6 percent) than Black offenders.

- **Nature of Discharge.** Black offenders receive discharges less often (by 3.3 percent) than White offenders. Where discharges are imposed, White offenders more often receive bad conduct discharges (by 4.7 percent) than Black offenders; Black offenders receive dishonorable discharges slightly more often (by 1.4 percent) than White offenders.

- **Reduction in Charges.** Black offenders more often have their charges reduced by 75 percent or more (by 0.8 percent) than White offenders. White offenders receive no reduction in charges more often (by 1.1 percent) than Black offenders.

- **Reduction in Confinement.** Almost all confinements (88 percent) for both Black and White offenders are either suspended or reduced by 75 percent or more. Of these, Black offenders more often receive suspended confinements (by 6.6 percent) than White offenders. White offenders, as a consequence, more often receive reduced confinements of 75 percent or more (by 6.3 percent) than Black offenders.

1-11. OBSERVATIONS

a. For the multiyear assessment, the evaluation of the court-martial trial process, as characterized by the 11 factors selected from the court-martial case records, showed the largest magnitude of the treatment differences for these factors was a difference of 13.6 percent, associated with White offenders pleading guilty to the charges more often than Black offenders and the reciprocal difference of 13.0 percent associated with Black offenders pleading not guilty more often than White offenders. The magnitude of the differences for these and the other factors, while notable, is relatively small in the context of the differential present in the issue of overrepresentation by minorities.

b. Use of statistical models considering sets, rather than pairings, of the court-martial and soldier factors failed to robustly predict the racial group membership of offenders. This suggests that the trial process, as characterized by these factors, is not sensitive to racial group membership.

c. On balance, the analysis, while identifying differences in treatment, found none so significant, either individually or collectively, as to provide evidence of inequitable treatment of Black offenders in the court-martial process.

CHAPTER 2

INTRODUCTION

2-1. BACKGROUND. The Office of the Deputy Chief of Staff for Personnel requested an evaluation of the Army judicial (court-martial) proceedings (Appendix B).

2-2. EVALUATION OF OBJECTIVES. The objectives set for the evaluation were to: (1) assess whether minority soldiers are treated as equitably as white soldiers in courts-martial proceedings and (2) identify any specific factors in the proceedings data base which could imply nonequitable treatment.

2-3. SCOPE OF EVALUATION. The report is focused on a particular aspect of the overall problem of minority overrepresentation in the Army justice system, namely, treatment within the judicial process, as distinguished from the more informal nonjudicial processes also available to the unit commander to deal with minor offenses.

2-4. OVERVIEW OF ARMY DISCIPLINARY PROCESS. Within the Army, there are two broad categories of proceedings leading to punishment for offenses, namely, nonjudicial proceedings and judicial proceedings.

a. Nonjudicial Proceedings

(1) Nonpunitive Measures. Nonjudicial proceedings are conducted at the discretion of the unit commander to address minor misconduct in violation of the Uniform Code of Military Justice. However, commanders are to use nonpunitive measures to the fullest extent possible before resorting to nonjudicial punishment. Nonpunitive measures are primarily tools for teaching proper standards of conduct and performance and do not constitute punishment. They include denial of privileges, counseling, and administrative reduction in grade.

(2) Nonjudicial Punishment. Nonjudicial punishment is frequently fitting in cases involving minor offenses under the UCMJ where nonpunitive measures are considered inadequate or inappropriate. Nonjudicial punishment is administered under the provisions of (UP) Article 15, UCMJ, at the lowest level of command commensurate with the needs of discipline. If the immediate commander's maximum nonjudicial punishment authority is insufficient to impose proper punishment, the case may be referred to an appropriate superior. Additionally, the decision to file a record of the nonjudicial punishment in the soldier's local personnel file, or Army-level personnel file (E-5 and above only), must be made by the commander. The need for this filing, with its negative career implications, must be carefully weighed. All nonjudicial proceedings UP Article 15, UCMJ, are recorded on DA Form 2627. The soldier generally has a right, UP the UCMJ, to demand trial by court-martial in lieu of accepting nonjudicial punishment. The details of the procedures involved are covered in Army Regulation (AR) 27-10 (Military Justice) (Ref 1), the Manual for Courts-Martial (MCM) (Ref 2), and the Legal Guide for Commanders (Ref 3).

(3) Escalation of Proceedings. As mentioned above, trial by court-martial can result from a soldier exercising his right to demand trial rather than accepting Article 15 nonjudicial punishment, if offered. Alternately, if the commander, after conducting a preliminary investigation, determines that an offense UP the UCMJ

occurred for which the appropriate punishment exceeds his (or his superiors') maximum punishment authority UP Article 15, then formalized charges and a request for trial by court-martial would be prepared and forwarded in accordance with established procedures.

b. Judicial Proceedings

(1) Charges. Each case is brought by a convening authority (commander) and consists of one or more charges. Each charge is for an offense listed in the UCMJ. The UCMJ itemizes the penalties for each offense by prescribing a maximum confinement period, the types of discharge applicable, and amount of fine which the court can impose.

(2) Types of Proceedings. The court is convened at one of four levels: a general court-martial, which is the highest level of court in terms of the rank of presiding officer and members and the sentencing authority, a special court-martial convened with explicit authority to impose a bad conduct discharge (BCD), a special court-martial (lacking BCD power), or a summary court-martial with the least sentencing power. The court may consist of a single military judge, a board of officers, a board of officers and enlisted personnel (if the enlisted participation on the board is requested by an enlisted offender), or a single officer (summary court only).

(3) Outcome. The charges are adjudicated individually by the court UP the UCMJ for each charge. Based on its deliberations, the court determines a single, undifferentiated sentence for all charges where guilt is found, with mitigation of the maximum penalties provided based on evidence presented at trial and judicial judgment.

2-5. COURT-MARTIAL DATA

a. Source. The Clerk of Court of the US Army Judiciary is the Army's focal activity for records associated with the judicial process. The Clerk of Court receives records of trials, petitions affecting trials, and appellate matters. As part of these recordkeeping responsibilities, the Clerk of Court has a computer-based Court-martial Case Records data base system. This system is updated with specifics of each court-martial case, submitted by the presiding judge (or delegated) as the case is concluded.

b. Data Overview. With the cooperation of the Clerk of Court office, court-martial case records for all cases above the level of summary court for the period FY 1987 to FY 1992 were provided for use in this study. The data is extensive, consisting of some 14,000 cases over the 6-year period; of these, 12,177 cases dealing with enlisted personnel, but excluding noncommissioned officers and limited to Black and White personnel (paragraph 2-6c), were selected for analyses.

c. Data Preprocessing

(1) Trial Charges. Within each case, each charge appears in a separate case record which results in a varying number of records per case. To deal with these multiple charge records, the data was preprocessed to substitute several composite measures for the individual charges in the case, and thereby allow the case to be reduced to a single record. This was done by computing the following measures for each case:

- **Number of Charges.** A numerical count of the number of charges filed in the case.
- **Time Faced on Charges.** The sum of the maximum confinement for each charge as filed. The maximum confinements were read from a study-prepared UCMJ file, based on the maximum punishments listed in the Manual for Courts-Martial (Ref 2).
- **Nature of the Highest Charge.** The classification code of the charge with the longest confinement period from the (above cited) UCMJ file, based on codes prepared by the study, as reviewed and approved by the study sponsor (see paragraph 3-4c, Chapter 3).

(2) Trial Outcome Measures. In addition, two other measures were computed to deal with adjustments made by the court to the charges and confinement period as follows:

- **Reduction in Charges.** The difference between the time faced on charges as filed and the total maximum confinement for charges as found at trial.
- **Reduction in Confinement.** The difference between the total maximum confinement for the charges found at trial and the confinement actually imposed by the court.

(3) Data File Generation. With the measures computed, the data was then formatted and loaded into special files for use with the statistical software packages used in the analysis (see Chapters 3 and 4).

2-6. COURT-MARTIAL ACTIVITY

a. Case Load Ratios by Race. The court-martial data provided to the study was used to generate counts of the number of court-martial cases over the 6-year period. These case counts, and the number of enlisted soldiers in the Army over this period taken from manpower data, were then expressed as percentages of their respective totals to adjust for the differences in numbers, by race, in the Army. The White-to-Black ratio for both the enlisted strength and enlisted offenders' percentages were then computed as shown in Table 2-1.

Table 2-1. Enlisted End Strength and Offenders by Race

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
PART 1 - ENLISTED STRENGTH (PERCENT)						
TOTAL ENLISTEES	666,000	654,600	652,000	623,500	585,100	511,336
WHITE	62%	61%	60%	59%	59%	58.4%
BLACK	29%	31%	32%	32%	32%	31.5%
OTHER	9%	8%	8%	9%	9%	10.1%
TOTAL	100%	100%	100%	100%	100%	100%
WHITE/BLACK RATIO	2.1	2.0	1.9	1.8	1.8	1.9
PART 2 - ENLISTED OFFENDERS (PERCENT)						
TOTAL OFFENDERS	2,693	2,669	2,548	2,401	1,830	1,770
WHITE	52%	52%	49%	47%	47%	43%
BLACK	44%	43%	46%	48%	48%	51%
OTHER	4%	5%	5%	5%	5%	6%
TOTAL	100%	100%	100%	100%	100%	100%
WHITE/BLACK RATIO	1.2	1.2	1.1	1.0	1.0	0.8

b. Race Ratio Comparison. Comparison of the White-to-Black ratios in Part 1 and Part 2 of Table 2-1 shows substantially increased involvement of Black enlisted soldiers in the court-martial process. The White-to-Black ratios of the enlisted population in the Army are approximately 2:1, while the White-to-Black ratios of court-martial cases are approximately equal (1:1). Thus, there are twice as many cases with Black accused as anticipated by equal representation. This data substantiates, at the court-martial level, the claim of overrepresentation of Black soldiers in the Army justice system. The table also shows an underrepresentation of the other minorities in the Army justice system. On this basis, and with the approval of the sponsor, the report was limited to consideration of only Black and White offenders.

CHAPTER 3

ASSESSMENT METHODOLOGY

3-1. INTRODUCTION. This chapter describes the manner in which the assessment of the equitable treatment of Black and White soldiers in the Army judicial system (courts-martial) was conducted.

3-2. ISSUES FOR ANALYSIS. The analysis addresses two basic issues.

- What case-related and other factors should be used to characterize the court-martial proceedings to facilitate recognition of any differences in treatment?
- Are there any differences in the treatment of offenders, by race, in the court-martial proceedings, and are there any specific factors in the proceedings data which could imply nonequitable treatment?

In responding to these questions, consideration is given to: (1) the nature and amount of trial data available, (2) the opportunities presented in the data to characterize both the trial proceedings and the accused, and (3) the technique(s) appropriate to the detection and quantification of any differences in treatment. Each of these considerations is discussed and brought to resolution in the following paragraphs.

3-3. APPROACH TO TRIAL DATA

a. Population Considered. The analysis is focused on the judicial process (courts-martial) for disciplinary actions in the Army. The examination is limited to accused Black and White enlisted personnel; other minorities with less representation in the Army justice system (paragraph 2-5b) are not considered.

b. Time Period. The data selected covers all courts-martial proceedings for the period FY 1987 to FY 1992. This period includes the mobilization for, and execution of, Operations DESERT SHIELD and DESERT STORM.

c. Case Data. The analysis uses, and is limited to, court-martial case data collected and maintained in a documented data base (Ref 4) by the US Army Judiciary Clerk of Court. This continuously updated data base provides reasonably complete coverage of each case including charges, trial conditions, and outcome as well as personal and military data for the accused. A total of 12,711 cases for study purposes (paragraph 2-5b) was present in the data for the period FY 1987 to FY 1992.

3-4. APPROACH TO TRIAL PROCEEDINGS. The court-martial process is characterized for analysis as a sequential process consisting of three stages: trial charges, trial activity, and trial outcome. For each stage, factors are selected from the data base which are appropriate to the stage and are considered potentially sensitive to treatment differences. The trial process and the factors associated with each stage of the process are shown in Figure 3-1. The factors are individually described in the following paragraphs. These factors are collectively referred to as the PROCESS factors in subsequent discussions.

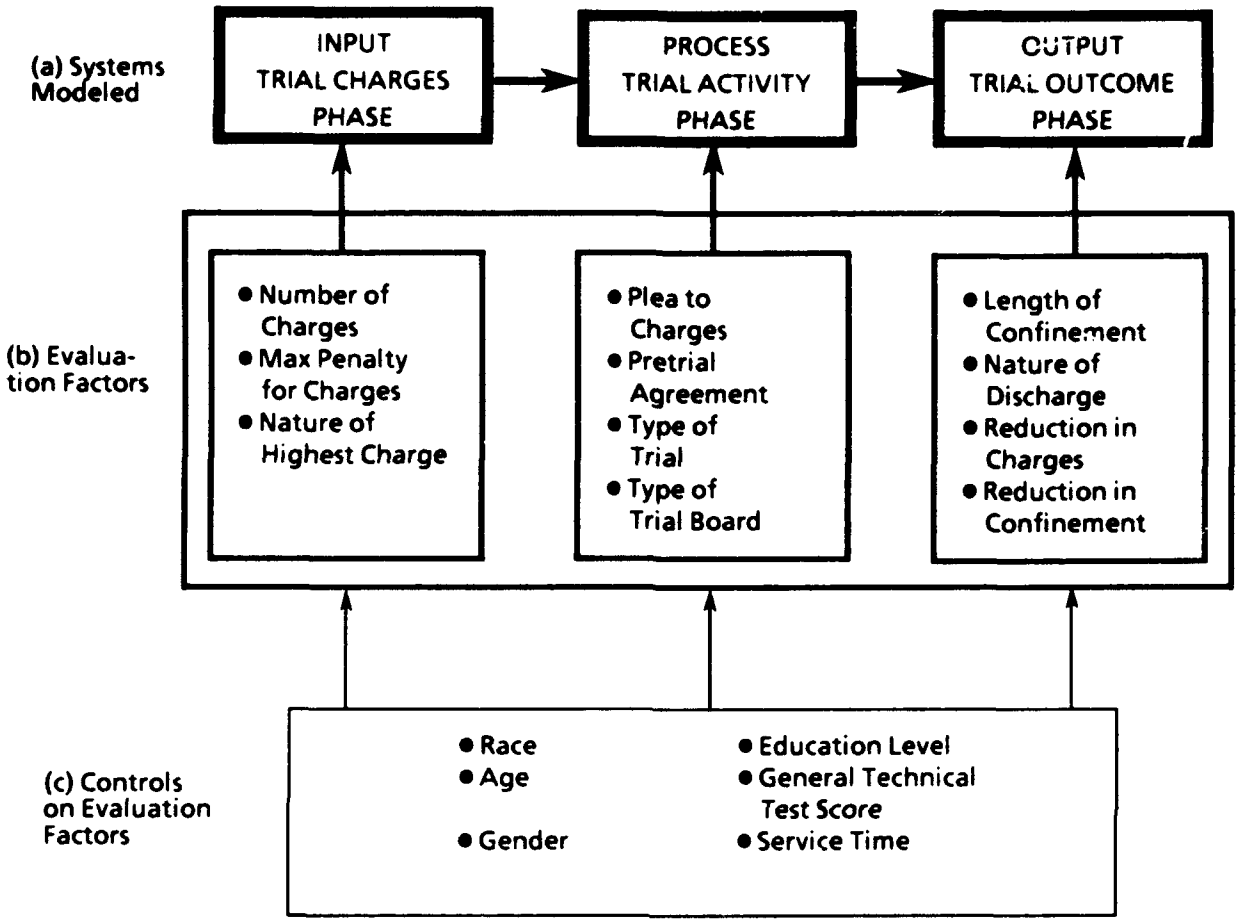

Figure 3-1. Systems Model of Trial Process

a. Number of Charges Factor

(1) Description. This (numeric) factor is a count of the number of charges present in the case against the accused. This is one of five study-generated measures produced from data items in the case data.

(2) Relevance to Treatment. This factor reflects both the actions of the accused, who perpetrates the behavior, and the trial counsel, who characterizes the behavior for trial purposes. These elements cannot be separated, but may interact in different ways, possibly dependent on race.

b. Time Faced on Charges Factor

(1) Description. This (numeric) factor is the sum of the maximum confinements, as provided in the UCMJ, for all charges brought against the accused. It indicates the accused's maximum exposure to confinement. This is one of five study-generated measures produced from data items in the case data.

(2) Relevance to Treatment. This factor provides a numeric measure of the severity of the case brought against the accused. It includes not only the number of the offenses, but the seriousness of the offenses as measured by the maximum sentence provided by law. As with Number of Charges factor, this factor is, in part, at the judgment of the trial counsel and might be made in different ways, possibly dependent on race.

c. Nature of Highest Charge Factor

(1) Description. This (nonnumeric) factor provides another view of the offenses in the case by identifying the nature of highest charge present. The nature of the highest charge is given by the offense in the case with the highest maximum sentence. In a situation where two offenses have the same maximum sentences, the offense with the higher rank, as identified in the following table, is selected as the nature of the highest charge. The nature of the offense is identified from a study-prepared table of offenses (Appendix F), which gives, for each MCM offense the offense category and the maximum sentence for the offense. The offense categories were defined and developed for the study, with sponsor participation, and are not in the MCM. This is one of five study-generated measures produced from data items in the case data.

Rank	Offense
1 (lowest)	Crime involving substances
2	Crime involving property
3	Crime involving persons
4	Crime involving general order
5 (highest)	Crime involving military order

(2) Relevance to Treatment. This factor reflects the principal thrust of the case against the accused. As with the Number of Charges and Time Faced on Charges factors, it represents, in part, the judgment of the trial counsel, and this judgment might be made in different ways, possibly dependent on race.

d. Plea to Charges Factor

(1) Description. This (nonnumeric) factor identifies the plea of the accused to the charges, namely, guilty or not guilty.

(2) Relevance to Treatment. The plea of guilty can be taken either on its face, or as a bargained position. A plea of not guilty can be taken either on its face, or as a challenge to the prosecution to prove its case. Therefore, the plea may be seen as a tool as well as a statement of choice. This opens the possibility of differences in plea patterns, possibly dependent on race.

e. Pretrial Agreement Factor

(1) Description. This (nonnumeric) factor identifies whether a pretrial agreement is present in the case.

(2) Relevance to Treatment. The presence or absence of a pretrial agreement sends a mixed message. The absence of an agreement may arise either from the decision of the accused not to request an agreement or from the decision of the trial counsel to refuse the agreement. Data from the case records cannot resolve this matter. This opens the possibility of differences in the pattern of pretrial agreements, possibly dependent on race.

f. Type of Trial Factor

(1) Description. This (nonnumeric) factor identifies the type of trial, namely, general court-martial, bad conduct court-martial, or special court-martial.

(2) Relevance to Treatment. The type of trial is based on the nature of the charges and administrative considerations. With elements of judgment present, there is the possibility of differences in the pattern of trial type, possibly dependent on race.

g. Type of Trial Board Factor

(1) Description. This (nonnumeric) factor identifies the type of trial board used for the court-martial, namely, military judge, officers and enlisted personnel, or officers (only).

(2) Relevance to Treatment. The selection of a trial board, while based largely on administrative considerations, does provide an option for the accused to request a board which includes enlisted personnel. The presumption in this option is that a board with enlisted participation may bring a more balanced view to the proceedings. With this element of judgment present, there is the possibility of differences in the pattern of trial board selection, possibly dependent on race.

h. Length of Confinement Factor

(1) Description. This (numeric) factor identifies the length of the confinement actually imposed by the court for all charges found.

(2) Relevance to Treatment. The length of the confinement imposed by the court, which incorporates the penalties for all charges of which the accused was found guilty, measures the extent to which the court applies its consideration to the evidence presented at trial. With this element of judgment present, there is the possibility of differences in consideration of confinement length, possibly dependent on race.

i. Nature of Discharge Factor

(1) Description. This (nonnumeric) factor identifies the type of discharge, if any, imposed as part of the sentencing imposed by the court, namely, none, bad conduct, or dishonorable.

(2) Relevance to Treatment. The type of discharge is a judgment on the performance of the individual while in the Army and intended as a public record of

this performance to be carried over into post-Army life. Only discharges with a negative connotation, associated with punitive actions, are included in this analysis. With this element of judgment present, there is the possibility of differences in the types of discharge, possibly dependent on race.

j. Reduction in Charges Factor

(1) Description. This (numeric) factor identifies the amount (in percent) of any reduction made in the charges as originally brought and the charges as found at trial. It is measured by the difference between the time faced on the charges brought and the corresponding time for the charges found at trial. This is one of five study-generated measures produced from data items in the case data.

(2) Relevance to Treatment. This factor was selected with the expectation that charges could be reduced over the course of the trial proceedings and this would measure accommodation to evidence collected in the case. With this element of judgment present, there is the possibility of differences in the reduction of charges, possibly dependent on race.

k. Reduction in Confinement Factor

(1) Description. This (numeric) factor identifies the amount (in percent) of the reduction between the total of the maximum confinements for the charges found at trial and the length of confinement imposed by the court. This is one of five study-generated measures produced from data items in the case data.

(2) Relevance to Treatment. This factor was selected with the expectation that sentences would be reduced at the discretion of the court from those provided under the UCMJ. With this element of judgment present, there is the possibility of differences in discretion by the court in the reduction of sentence length, possibly dependent on race.

3-5. APPROACH TO ACCUSED. The soldier before the court, charged with one or more offenses, is similarly characterized by factors considered sensitive to the treatment issue. The factors, selected from the data base, which characterize the accused both as an individual and as a participant in the Army, are summarized in the table below. The factors are individually described in the following paragraphs and are collectively referred to as the SOLDIER factors in subsequent discussions.

Individual factors	Participation factors
Race of accused	Civilian education
Age of accused	General technical test score
Gender of accused	Service time

a. Race of Accused Factor

(1) Description. This (nonnumeric) factor identifies the race of the accused. The factor is assigned the name RACE for citation in subsequent discussion.

(2) Relevance to Treatment. The race of the accused is the definitive discriminator in the analysis and drives all aspects of the assessment of difference in treatment.

b. Age of Accused Factor

(1) Description. This (numeric) factor identifies the age of the accused at the time of the court-martial. The factor is assigned the name AGE for citation in subsequent discussion.

(2) Relevance to Treatment. The age of an individual is a generalized estimator of the life experience of the accused, incorporating both interpersonal and work experiences. It is not a discriminator in itself, but may serve to isolate treatment differences when used as a control on the RACE factor.

c. Gender of Accused Factor

(1) Description. This (nonnumeric) factor identifies the gender of the accused. The factor is assigned the name GENDER for citation in subsequent discussion.

(2) Relevance to Treatment. The gender of an individual is a generalized discriminator in the life experience of the accused, incorporating both interpersonal and work experiences. It is not a discriminator in itself, but may serve to isolate treatment differences when used as a control on the RACE factor.

d. Civilian Education Factor

(1) Description. This factor (treated as numeric) identifies the education level attained by the accused before entry into the Army. The factor is assigned the name EDUCATION for citation in subsequent discussion.

(2) Relevance to Treatment. The education attained by an individual is both a particularized and generalized discriminator in the life experience of the accused, incorporating both interpersonal and work experiences. It is not a discriminator in itself, but may serve to isolate treatment differences when used as a control on the RACE factor.

e. General Technical Test Score Factor

(1) Description. This (numeric) factor identifies the score attained by the accused on the standard aptitude test administered upon entry into the Army. The factor is assigned the name SCORE for citation in subsequent discussion.

(2) Relevance to Treatment. The score is a direct measure of the aptitudes needed as a basis for skill training in specialized Army tasks. It reflects both formal educational attainment and informally acquired experiences and skills. It is not a

discriminator in itself, but may serve to isolate treatment differences when used as a control on the RACE factor.

f. Service Time Factor

(1) Description. This (numeric) factor identifies the length of military service of the accused at the time of the court-martial. The factor is assigned the name SERVICE for citation in subsequent discussion.

(2) Relevance to Treatment. The service time is a measure of the level of exposure to the practices and overall discipline imposed by Army life, particularly as it relates individual responsibility and accountability. It is not a discriminator in itself, but may serve to isolate treatment differences when used as a control on the RACE factor.

3-6. APPROACH TO EVALUATION. Two basic approaches are used in the evaluation of treatment differences as follows:

a. Factor-pair Approach. This approach uses the cross-tabulation technique to focus directly on the RACE of the accused and examines, in turn, the pairing of the RACE factor with each of the factors associated with the trial process (PROCESS factors). This technique provides a direct measure, in the form of frequency counts, of the interaction of each of the PROCESS factors with RACE. Since the frequency of race membership does not occur equally in court-martial cases, the analysis of the counts is conducted using the percentage distribution of the counts, rather than the counts themselves. This standardizes the comparison across RACE for the unequal counts by RACE.

b. Factor-set Approach. This approach focuses on all the factors as a set and uses linear combination models of SOLDIER and PROCESS factors which are equated to RACE to assert tendencies, by factor, which favor membership in either the group of Black offenders or the group of White offenders. This approach also provides ranking of the factor tendencies toward group membership.

c. Results Interpretation. The factor-pair and factor-set approaches are considered complementary, rather than duplicative. The underlying statistical concepts are similar but generate results with different orientations. The cross-tabulation technique focuses on a clear differentiation by race, while the modeling to predict group membership technique identifies tendencies for group membership. This difference in perspective is expected to offer constructive contrasts in the results and provide useful insights into the issue of differences in treatment.

CHAPTER 4

ASSESSMENT OF TREATMENT USING FACTOR-PAIRS

4-1. INTRODUCTION. This chapter examines the issue of difference in treatment in the judicial process using the statistical technique of cross-tabulation. The technique employs pairings of the PROCESS and SOLDIER factors described in Chapter 3 to examine for relationships bearing on the issue of treatment. Three families of cross-tabulations are generated, offering varying perspectives on treatment, as follows:

- **Multiyear Assessment.** All pairings of the SOLDIER factor of RACE with each of the 11 PROCESS factors are assessed for the multiyear period FY 87-92 for insight into any differences in treatment within the trial process.

- **Multiyear Assessment with Controls.** Again using the multiyear data, the SOLDIER factor of RACE is paired with the PROCESS factors, using the remaining SOLDIER factors as controls, for insight into any mediating effect of these factors on differences in treatment.

- **Year-by-year Assessment.** The SOLDIER factor of RACE is again paired with the PROCESS factors, this time for each year of the period FY 87-92, for insight into any differences in treatment over time.

4-2. OVERVIEW OF CROSS-TABULATION TECHNIQUE. The cross-tabulation technique considers pairs of factors and generates a count of the number of times the combinations of the factor levels (their frequency) appear in the data. The distribution of these frequencies is then examined to identify relationships between the factors. In particular, the SOLDIER factor of RACE, represented by the levels of Black and White, is cross-tabulated with the levels of each of the (11) PROCESS factors (Figure 3-1) characterizing the court-martial process. Since race membership does not occur with equal frequency in the court-martial cases, the analysis of the frequency distribution of the counts is conducted using the percentage distribution of the counts, rather than the counts themselves. This standardizes the comparison across RACE for the unequal numbers by RACE. The cross-tabulations were conducted using specially formatted files of court-martial case data (paragraph 2-4) in conjunction with the commercial software package, Statistical Package for the Social Sciences (SPSS), on a personal computer host.

4-3. MULTIYEAR ASSESSMENT

a. Purpose of Assessment. The multiyear assessment provides for a systematic examination of all possible pairings of the SOLDIER factor of RACE with each of the PROCESS factors for the overall period FY 87-92. The use of RACE as a factor in the pairings directly addresses the issue of difference in treatment in the trial process.

b. Generation of Data. Cross-tabulations, using the SPSS package, were generated for the pairings of each of the 11 PROCESS factors and the RACE factor. A total of 12,711 court-martial cases, covering the period FY 1987-1992, was included. The cross-tabulation results are compiled in Appendix D.

c. **Presentation of the Data.** Summaries of the cross-tabulations of RACE and the PROCESS factors extracted from Appendix D are shown in separate tables for the Trial Charge factors (Table 4-2), Trial Process factors (Table 4-3). and Trial Outcome factors (Table 4-4). The tables provide the following data.

(1) Column Labeled PROCESS FACTOR AND LEVELS. These entries identify each factor and its associated levels. The factor levels categorize the factor value In each case as a member of a range, so that it can be evaluated as part of that range by the cross-tabulation technique.

(2) Column Labeled PERCENT WHITE CASES. These entries show the factor level counts as converted into percentage (frequency) counts for all levels of the factor associated with White offenders (Appendix D). That is, the entries give the frequency distribution of the counts for White offenders.

(3) Column Labeled PERCENT BLACK CASES. These entries similarly give the frequency distribution of the counts for Black offenders.

(4) Column Labeled TREATMENT DIFFERENCE IN PERCENt. These entries identify, for each factor level, the percentage difference in treatment (computed as White minus Black) for each of the factor levels. Based on the order of subtraction, a positive sign (+) indicates the treatment difference is larger for White, and a negative sign (-) indicates the treatment difference is larger for Black.

(5) Column Labeled TREATMENT DIFFERENCE EVALUATION. These entries identify, for each factor, the measures used to characterize the differences for evaluation purposes.

(a) Common Mode (CM). A determination is made as to whether the modal level for each factor (level with largest percentage) is the same for both Black and White offenders. Where the modes for both racial groups are the same, a common mode is said to exist and is identified in the Treatment Difference Evaluation column with the abbreviation CM at the level where the maximum occurs.

> **Note:** the common mode, where it exists, represents the largest contrast in offenders by racial group for the factor. A situation where there is no common mode offers evidence of a difference in treatment. Given that a common mode exists, a further evaluation is made to determine if the largest difference occurs at the CM level or some other factor level for both both Black and White offenders.

(b) Maximum Percentage Difference (MAX). The maximum percentage difference is the largest difference present in the factor for White offenders. The entry is identified by determining the factor level with the largest positive percentage difference. This level is identified in the Treatment Difference Evaluation column by the abbreviation MAX at the level where the maximum occurs. It is possible, of course, that the MAX level occurs at the CM level.

(c) Minimum Percentage Difference (MIN). The minimum percentage difference is the largest difference in treatment present for Black offenders. The entry is identified by determining the factor level with the largest negative difference. This level is identified in the Treatment Difference Evaluation column by the

abbreviation MIN at the level where the minimum occurs. It is possible, of course, that the MIN level occurs at the CM level.

(6) Column Labeled APP D PAGE. These entries identify the page in Appendix D where the cross-tabulation results for the factor may be found.

Taken together, these table entries provide the basis for assessing the difference in treatment for each factor as described (next) under Assessment Procedure.

d. Assessment Procedure. The assessment of the individual factors is conducted using the data in Tables 4-1 through 4-3. The steps in the assessment of the factors are as follows:

Step 1. Confirm, where possible, that a common mode exists for the factor by the presence of a CM entry in the Treatment Difference Evaluation column.

Step 2. Examine the magnitudes associated with the MAX and MIN entries in the Treatment Difference Evaluation column.

Step 3. Collect the CM, MIN, and MAX values, along with the factor levels at which they occur, in a summary table for further analysis (see step 4)

Step 4. Express table data in narrative form to heighten understanding of its meaning.

e. Assessment of Individual Factors

(1) RACE vs Number of Charges

(a) Nature of Factor. This factor measures the number of charges brought against the accused at the start of the trial process. It reflects both the actions of the accused, who exhibits the offensive behavior, and the judgment of the prosecutor, who characterizes the behavior for trial purposes.

(b) Assessment of Factor. As shown in Table 4-1, a common mode for the factor exists, and occurs at the level of "2-4 Charges." The largest treatment difference present for the factor is associated with Black offenders, with a MIN value of -1.3 percent at the "8 or More Charges" level. In contrast, the largest treatment difference associated with White offenders with a MAX value of +0.5 percent at the "5-7 Charges" level.

(c) Comment on Factor. Cases involving a single offense are the least frequent (about 13 percent) and involve White offenders only slightly more often (by 0.4 percent) than Black offenders.

(2) RACE vs Time Faced on Charges

(a) Nature of Factor. This factor measures the total of the maximum sentences for all the offenses charged, that is, the maximum exposure of the accused to confinement.

(b) Assessment of Factor. As shown in Table 4-1, a common mode for the factor exists and occurs at the level of "5-10 Years." The largest treatment difference present for the factor is associated with White offenders with a MAX value of +1.8

percent at the "20-25 Years" level. In contrast, the largest treatment difference associated with Black offenders has a MIN value of -1.5 percent coinciding with the common mode level at the "5-10 Years" level.

Table 4-1. RACE vs Trial Charge Factors

PROCESS FACTOR AND LEVEL	PERCENT WHITE CASES	PERCENT BLACK CASES	TREATMENT DIFFERENCE IN PERCENT	TREATMENT DIFFERENCE EVALUATION[a]	APP D PAGE
Number of Charges:					D-2
Single Charge	13.7	13.3	+0.4		
2-4 Charges	47.2	46.8	+0.4	CM	
5-7 Charges	21.0	20.5	+0.5	MAX	
8 or More Charges	18.1	19.4	-1.3	MIN	
Total	100.0%	100.0%			
Time Faced on Charges:					D-3
Less than 5 Years	13.0	14.4	-1.4		
5-10 Years	22.0	23.5	-1.5	CM, MIN	
10-15 Years	13.4	13.2	+0.2		
15-20 Years	12.1	11.8	+0.3		
20-25 Years	9.0	7.2	+1.8	MAX	
25 or More Years	30.6	29.9	-0.7		
Total	100.1%	100.0%			
Nature of Highest Charge:					D-4
Military Order	26.6	22.4	+4.2	MAX	
General Order	34.3	30.2	+4.1	CM	
Persons	20.2	24.7	-4.5	MIN	
Property	4.5	6.4	-1.9		
Substances	14.4	16.2	-1.8		
Total	100.0%	99.9%			

[a]See paragraph 4-3c.

(c) Comment on Factor. Another choice for the common mode for the time faced factor exists using the open-ended interval of "25 or More Years" which, in fact, has the highest percentage level. However, the percentage distribution pattern across the levels shows a sharp decline in percentages off the peak at 5-10 years and suggests that if shorter intervals were taken within the open interval, the pattern of decline would continue. With this presumption, the "5-10 Years" interval is taken as the common modal level.

(3) RACE vs Highest Charge

(a) Nature of Factor. This factor measures the overall severity of offenses charged. It is a construct introduced into the analysis during the preprocessing of the case data files (Chapter 3). The computation first identifies the offense(s) in the case

with the longest maximum sentence. If there is more than one offense with the same maximum penalty, the offense with the higher rank is selected (paragraph 3-4c).

(b) Assessment of Factor. As shown in Table 4-1, a common mode for the factor exists, and occurs at the level of crime against "General Order." The largest treatment difference present for the factor is associated with Black offenders, with a MIN value of -4.5 percent for crime against "Persons" level. In contrast, the largest difference associated with White offenders has a MAX value of +4.2 percent for crime against "Military Order" level.

(c) Comment on Factor. In addition to these largest (MAX, MIN) differences, differences occur for each of the five crime categories (see paragraph 3-4c) as follows. Black offenders are more often accused of crimes against property (by 1.9 percent) and substances (by 1.8 percent). White offenders are more often accused of crimes against general order (by 4.1 percent).

(4) RACE vs Plea to Charges

(a) Nature of Factor. This factor is an important involvement of the accused in the trial process and carries a mixed message. A plea of guilty can be taken reflect a preponderance of evidence against the accused or the consequence of a pretrial agreement. A plea of not guilty can be taken as either a weakness in the evidence or a challenge to the prosecution to prove its case.

(b) Assessment of Factor. As shown in Table 4-2, a common mode for the factor exists, and occurs at the level of "Guilty." The largest treatment difference present for the factor is associated with White offenders, with a MAX value of +13.6 percent, and this coincides with the common mode level of "Guilty." In contrast, the largest difference associated with Black offenders has a MIN value of -13.0 percent at the "Not Guilty" level.

(c) Comment on Factor. The MAX and MIN differences for the plea factor are reciprocally related in that they represent a choice between a pair of alternatives (the "Guilty/Contest" level is an infrequent choice and accounts for the small inequality).

(5) RACE vs Pretrial Agreement

(a) Nature of Factor. The negotiation of a pretrial agreement is important involvement of the accused in the trial proceedings. Again, a mixed message may be present. The absence of an agreement may arise either from the failure to reach an agreement or a decision by the accused not to seek an agreement. Data in the case records cannot resolve the matter.

(b) Assessment of Factor. As shown in Table 4-2, a common mode for the factor exists and occurs at the level of "Standard" agreement. The largest treatment difference present for the factor is associated with Black offenders, with a MIN value of -13.3 percent at the "None" (no agreement) level. In contrast, the largest difference associated with White offenders has a MAX value of +8.1 percent coinciding with the common mode level of "Standard" (stipulations) agreement. If the White offender value of +5.2 percent, for the factor level of "Other" (case-specific stipulations) agreement, is added to the White offender MAX value of +8.1 percent for the "Standard" agreement, the total of +13.3 percent mirrors the MIN of -13.3 percent for Black offenders.

Table 4-2. RACE vs Trial Activity Factors

PROCESS FACTOR AND LEVEL	PERCENT WHITE CASES	PERCENT BLACK CASES	TREATMENT DIFFERENCE IN PERCENT	TREATMENT DIFFERENCE EVALUATION[a]	APP D PAGE
Plea to Charges:					D-5
Not Guilty	16.4	29.4	-13.0	MIN	
Guilty/Contest	10.7	11.3	-0.6		
Guilty	72.9	59.3	+13.6	CM, MAX	
Total	100.0%	100.0%			
Pretrial Agreement:					D-6
None	28.0	41.3	-13.3	MIN	
Standard	54.8	46.7	+8.1	CM, MAX	
Other	17.2	12.0	+5.2		
Total	100.0%	100.0%			
Type of Trial:					D-7
Bad Conduct	34.2	33.4	+0.8		
General	61.7	60.5	+1.2	CM, MAX	
Special	4.1	6.1	-2.0	MIN	
Total	100.0%	100.0%			
Type of Trial Board:					D-8
Officers/Enlisted	15.3	21.7	-6.4	MIN	
Military Judge	74.8	68.6	+6.2	CM, MAX	
Officers	9.9	9.6	+0.3		
Total	100.0%	99.9%			

[a]See paragraph 4-3d .

(c) Comment on Factor. Since a plea of not guilty precludes a pretrial agreement, the MIN value of -13.3 percent associated with no pretrial agreement may be correlated with the MIN value of -13.0 percent associated with the not guilty plea above.

(6) RACE vs Type of Trial

(a) Nature of Factor. The type of trial is based on the nature of the offenses involved and administrative considerations, as discussed in Chapter 3.

(b) Assessment of Factor. As shown in Table 4-2, a common mode for the factor exists and occurs at the level of "General" court-martial. The largest treatment difference present for the factor is associated with Black offenders, with a MIN value of -2.0 percent at the level of "Special" court-martial. In contrast, the largest difference associated with White offenders has a MAX value of +1.2 percent, coinciding with the common mode level of "General" court-martial.

(c) Comment on Factor. In addition to these largest (MAX, MIN) differences, White offenders are tried by "Bad Conduct" courts-martial more often (by 0.8 percent) than Black offenders.

(7) RACE vs Type of Trial Board

(a) Nature of Factor. The type of trial board, while based on administrative considerations (Chapter 3), does provide an option for the accused to request a board which includes enlisted personnel. The presumption in this option is that a board with enlisted participation may bring a more balanced view to the proceedings.

(b) Assessment of Factor. As shown in Table 4-2, a common mode for the factor exists and occurs at the level of a "Military Judge" trial board. The largest treatment difference present for the factor is associated with Black offenders with a MIN value of -6.4 percent at the level of "Officers/Enlisted" trial board. In contrast, the largest difference associated with White offenders has a MAX value of +6.2 percent, coinciding with the common mode level of "Military Judge" trial board.

(c) Comment on Factor. Cases before a board consisting only of officers are the least frequent (about 10 percent) and involve White offenders only slightly more often (by 0.3 percent) than Black offenders.

(8) RACE vs Length of Confinement

(a) Nature of Factor. The length of the confinement imposed by the court, which incorporates the penalties for all charges of which the accused was found guilty, measures the extent to which the court acted to interpret the evidence presented at trial. The larger percentages of confinements were observed to be associated with shorter confinements. A geometric scale of intervals was selected to highlight this pattern.

(b) Assessment of Factor. As shown in Table 4-3, a common mode for the factor exists and occurs at the level of "Less than 6 Months." The largest treatment difference present for the factor is associated with Black offenders, with a MIN value of -6.6 percent at the level of "No Confinement." In contrast, the largest difference associated with White offenders has a MAX value of +4.6 percent coinciding with the common mode level of "Less than 6 Months."

(c) Comment on Factor. About one-half (45 percent) of all confinements are either suspended by the court (no confinement) or last for less than 6 months. Black offenders, as indicated above, more often receive suspensions, and White offenders, as a consequence, tend to receive the sentences of less than 6 months. The remaining confinement periods show differences across race, but these are less than 4 percent and are not considered significant.

(9) RACE vs Nature of Discharge

(a) Nature of Factor. The type of discharge is a measure of the performance of the individual while in the Army and is intended as a public record of this performance to be carried over into post-Army life. Only discharges with a negative connotation, associated with punitive actions, are included in this analysis. The punitive discharge is imposed as part of the sentence usually in conjunction with a period of confinement.

(b) Assessment of Factor. As shown in Table 4-3, a common mode for the factor exists and occurs at the level of "Bad Conduct" discharge. The largest treatment difference present for the factor is associated with White offenders, with a MAX value of +4.7 percent, coinciding with the common mode level of "Bad Conduct" discharge. In contrast, the largest difference associated with Black offenders has a MIN value of -3.3 percent at the "No Discharge" level.

(c) Comment on Factor. In addition to these largest (MAX, MIN) differences, Black offenders receive "Dishonorable" discharges more often (by 1.4 percent) than White offenders.

(10) RACE vs Reduction in Charges

(a) Nature of Factor. This factor was selected with the expectation that charges might be reduced in the course of the trial to accommodate to the quality and quantity of the evidence in the case.

(b) Assessment of Factor. As shown in Table 4-3, a common mode for the factor exists and occurs at the level of "No Reduction" in charges. The largest treatment difference present for the factor is associated with White offenders, with a MAX value of +1.1 percent, coinciding with the common mode level of "No Reduction." In contrast, the largest difference associated with Black offenders has a MIN of -0.8 percent at the "More than 75%" in charges level.

(c) Comment on Factor. In general, most cases (about 84 percent) do not involve any reduction in charges. Where reductions are involved, differences across race are less than 1 percent.

Table 4-3. RACE vs Trial Outcome Factors

PROCESS FACTOR AND LEVEL	PERCENT WHITE CASES	PERCENT BLACK CASES	TREATMENT DIFFERENCE IN PERCENT	TREATMENT DIFFERENCE EVALUATION[a]	APP D PAGE
Length of Confinement:					D-9
No Confinement	14.8	21.4	-6.6	MIN	
Less than 6 Months	29.9	25.3	+4.6	CM, MAX	
6-12 Months	12.3	12.0	+0.3		
12-24 Months	15.0	12.7	+2.3		
24-48 Months	15.4	15.0	+0.4		
48-96 Months	7.7	7.7	0.0		
96 or More Months	5.0	5.8	-0.8		
Total	100.1%	99.9%			
Nature of Discharge:					D-10
None	22.4	25.7	-3.3	MIN	
Bad Conduct	57.0	52.3	+4.7	CM, MAX	
Dishonorable	20.6	22.0	-1.4		
Total	100.0%	100.0%			
Reduction in Charges:					D-11
No Reduction	84.9	83.8	+1.1	CM, MAX	
Up to 25%	4.4	4.5	-0.1		
25-50%	4.1	4.4	-0.3		
50-75%	3.2	2.9	+0.3		
More than 75%	3.5	4.3	-0.8	MIN	
Total	100.1%	99.9%			
Reduction of Confinement:					D-12
No Reduction	0.5	0.5	0.0		
Up to 25%	0.7	0.4	+0.3		
25-50%	2.0	2.1	-0.1		
50-75%	8.4	8.3	+0.1		
75% or More Confinement	73.6	67.3	+6.3	CM, MAX	
Suspended	14.8	21.4	-6.6	MIN	
Total	100.0%	100.0%			

[a]See paragraph 4-3d.

(11) RACE vs Reduction in Confinement

(a) Nature of Factor. This factor measures the difference between the sum of maximum sentences for the offenses provided under the UCMJ and the single (composite) sentence imposed by the court for these offenses.

(b) Assessment of Factor. As shown in Table 4-3, a common mode for the factor exists and occurs at the level of a "75% or More" (reduction). The largest treatment difference present for the factor is associated with Black offenders, with a MIN value of -6.6 percent at the level of "Confinement Suspended." In contrast, the largest difference associated with White offenders has a MAX value of +6.3 percent, coinciding with the common mode level of "75% or More" reduction.

(c) Comment on Factor. Almost all confinements (87 percent) are either suspended by the court or reduced by 75 percent or more. Black offenders, as indicated above, more often receive suspensions, and White offenders, as a consequence, tend to receive the 75 percent or more reduction.

f. Narrative Assessment of Factors. The evaluation of the court-martial trial process is shown in Table 4-4. The table includes the common mode for the factor, the maximum percentage difference associated with White offenders (MAX), the minimum percentage difference associated with Black offenders (MIN), and identification of the levels at which these values occur. The table data, supplemented by data from Tables 4-1 to 4-3 and Appendix D, may be summarized (by trial phase) as follows:

(1) Trial Charges Phase

- **Number of Charges.** Black offenders are more often accused with 8 or more charges (by 1.3 percent) than White offenders. White offenders are more often accused with 5-7 charges (by 0.5 percent) than Black offenders.

- **Time Faced on Charges.** Black offenders more often face time on charges of 5-10 years (by 1.5 percent) than White offenders. White offenders more often face time on charges of 20-25 years (by 1.8 percent) than Black offenders.

- **Nature of Highest Charge.** Black offenders are more often accused of crimes involving persons (by 4.5 percent), and to a lesser extent in crimes against property (by 1.9 percent) and substances (by 1.8 percent). White offenders are more often accused of crimes against military order (by 4.2 percent) and general order (by 4.1 percent) than Black offenders.

(2) Trial Activity Phase

- **Plea to Charges.** White offenders make a plea of guilty more often (by 13.6 percent) than Black offenders.

- **Pretrial Agreement.** Black offenders are less involved in pretrial agreements (by 13.3 percent) than White offenders. This disposition to forego a pretrial agreement is consistent with the disposition to the not guilty plea (above).

- **Type of Trial.** Black offenders more often face a Special Court-martial (by 2.0 percent) than White offenders. White offenders more often face a General Court-martial (by 1.2 percent) than Black offenders.

- **Type of Trial Board.** Black offenders more often request participation of enlisted personnel on the trial board (by 6.4 percent) than White offenders.

Table 4-4. Treatment Difference Summary base case)

Factor	Treatment difference	Treatment difference evaluation[a]	Factor level
Trial Charges Factor			
Number of charges	-1.3 percent	MIN	8 or more charges
	+0.4 percent	CM	2-4 charges
	+0.5 percent	MAX	5-7 charges
Time Faced on Charges	-1.5 percent	CM, MIN	5-10 years
	-1.8 percent	MAX	20-25 years
Nature of Highest Charge	-4.5 percent	MIN	Crime against persons
	+4.1 percent	CM	Crime against general order
	+4.2 percent	MAX	Crime against military order
Trial Activity Factorsa			
Plea to Charges	-13.0 percent	MIN	Plea of not guilty
	+13.6 percent	CM, MAX	Plea of guilty
Pretrial Agreement	-13.3 percent	MIN	No agreement in case
	+8.1 percent	CM, MAX	Standard agreement
Type of Trial	-2.0 percent	MIN	Special court-martial
	+1.2 percent	CM, MAX	General court-martial
Type of Trial Board	-6.4 percent	MIN	Officers & enlisted
	+6.2 percent	CM, MAX	Military judge
Trial Outcome Factors			
Length of Confinement	-6.6 percent	MIN	No confinement
	+4.6 percent	CM, MAX	Less than 6 months
Nature of Discharge	-3.3 percent	MIN	No discharge
	+4.7 percent	CM, MAX	Bad conduct discharge
Reduction in Charges	-0.8 percent	MIN	75% of more reduction
	+1.1 percent	CM, MAX	No reduction
Reduction in Confinement	-6.6 percent	MIN	Confinement suspended
	+6.3 percent	CM, MAX	75 percent or more reduction

[a]See paragraph 4-3d.

(3) **Trial Outcome Phase**

- **Length of Confinement.** About half (46 percent) of all confinements are either suspended or last less than 6 months. Of these, Black offenders more often receive suspended sentences (by 6.6 percent) than White offenders. White offenders, as a consequence, receive sentences of less than 6 months more often (4.6 percent) than Black offenders. The remaining confinement periods show differences of less than 4 percent and are not considered notable.

- **Nature of Discharge.** Black offenders receive discharges less often (by 3.3 percent) than White offenders. Where discharges are imposed, White offenders more often receive bad conduct discharges (by 6.3 percent) than Black offenders. Black offenders receive dishonorable discharges slightly more often (by 1.4 percent) than White offenders.

- **Reduction in Charges.** Black offenders more often have their confinement suspended (by 6.6 percent) than White offenders. White offenders receive reduction in confinement of 75 percent or more (by 6.3 percent) more often than Black offenders.

- **Reduction in Confinement.** Almost all (87 percent) confinements are either suspended or reduced by 75 percent or more. Of these, Black offenders more often receive suspended confinements (by 6.6 percent) than White offenders. White offenders, as a consequence, more often receive reduced confinements of 75 percent or more (by 6.3 percent) than Black offenders.

4-4. MULTIYEAR ASSESSMENT WITH CONTROLS

a. Purpose of Assessment. This assessment extends the evaluation of the multiyear data (base case data) considered in paragraph 4-3, using the five SOLDIER factors of GENDER, AGE, SERVICE, EDUCATION, and SCORE as controls. Of the 11 PROCESS factors considered in the multiyear assessment, this assessment focuses on the 7 factors found to have treatment differences (Table 4-4) in excess of 2 percent. The 2 percent threshold is set to limit the analysis workload to the examination of factors with a demonstrated potential for generation of treatment differences. By examining the data in sets, corresponding to the levels of the control factors being applied, possibly different percentage distributions by racial group may be identified, indicating a mediating effect of the control factor on the base case results.

b. Generation of Data. Successive three-way cross-tabulations of RACE versus the seven factors were generated for each level of each of the five SOLDIER factors. The volume of data generated, however, is awkward to inspect in printed form. As a consequence, it was held in computer data files and inspected on a monitor using a "list" utility. The cross-tabulations are not documented in this report. In inspecting the cross-tabulation data, it was observed that for two control levels, namely EDUCATION at level 5--"college grad" and EDUCATION at level 6--"post grad," the size of the tabulation arrays dropped below 100 cases, and some cell sizes in the arrays dropped below 10. Under these circumstances, the use of the percentage as a measure of treatment difference was not considered appropriate, and the counts from these two control levels were not included in the assessment.

c. Presentation of the Data. The results of the cross-tabulations are summarized in Appendix G, Tables G-3 to G-7. These tables report the common mode, the maximum treatment differences (White offenders) and the minimum treatment differences (Black offenders), with one table for each control factor. A further summary of these results into a single table, for convenience in assessing the effect of the controls, is shown in Table 4-5. This table is organized into the following columns of information:

(1) Process Factor. This column shows the seven process factors grouped by trial phase.

(2) Common Mode Shift. This column indicates whether any shift has occurred in the factor level of the common mode of each of the control factors, at any of its levels. As reported in the data in Appendix G, no shifts in the common mode were observed at any level of any factor. This general condition is noted with the single entry of "None" in this column for each process factor.

(3) Type of Value. This column identifies, for both the base case and each control factor, the following two types of values: the maximum percentage difference (MAX) as used in the base case, the minimum percentage difference (MIN) as used in the base case. In addition, the MAX and MIN also identify the respective differences between the base case values and control case values as described (below) in paragraph 4-4c(5).

(4) Base Case Values. This column identifies the MAX and MIN values for each factor as taken from the base case (Table 4-4).

(5) Factor Values and Control Differences by Control Factor. This set of five column-pairs indicates the MAX and MIN values for each factor when each of the five control factors are applied to the base case data (Table 4-4). The first column of the pair is labeled "Value" and identifies the actual MAX and MIN values associated with use of the control. The second column of the pair is labeled "Diff" and is the difference between base case MAX and MIN values and corresponding values in the control case.

> **Note:** in computing the "Diff," a positive (+) difference always indicates that the control case value is larger in absolute magnitude than the base case value; and a negative (-) difference always indicates that the control case value is smaller in absolute magnitude than the base case value. To maintain this convention, recalling that the MIN values are always negative, the results of the "Diff" calculation for MIN values are reversed in sign.

These measures, and specifically the "Diff" values, provide the basis for assessing the effects of the control on the base case differences, as described (below) in paragraph 4-3d.

Table 4-5. Treatment Differences with Controls

Process Factor	Common Mode Shift	Type of Value	Base Case Values	Factor Values & Control Differences by Control Factor									
				Gender		Age		Service		Education		Score	
				Value	Diff	Value	Diff	Value	Diff	Value	Diff	Value	Diff
Trial Charge Factors													
Nature of highest charge	None	MIN	-4.5	-7.4	2.9	-12.1	7.6	-9.9	5.4	-8.4	3.9	-8.1	3.6
		MAX	4.2	6.0	1.8	14.0	9.8[a]	11.3	7.1a	10.2	6.0	11.9	7.7
Trial Activity Factors													
Plea to charges	None	MIN	-13.0	-11.8	-1.2[b]	-11.9	-1.1	-12.3	-.7	-13.3	.3	-18.6	5.6
		MAX	13.6	13.5	-.1	13.8	.2	12.0	-1.6	13.9	.3	19.7	6.1
Pretrial agreement	None	MIN	-13.3	-14.3	1.0	-11.9	-1.4	-11.5	-1.8	-13.5	.2	-20.7[c]	7.4
		MAX	8.1	11.2	3.1	8.5	.4	7.1	-1.0	11.7	3.6	13.4	5.3
Type of trial board	None	MIN	-6.4	-5.8	-.6	-16.1	9.7	-7.0	.6	-8.1	1.7	-8.4	2.0
		MAX	6.2	7.5	1.3	5.5	-.7	6.5	.3	9.3	3.1	9.8	3.6
Trial Outcome Factors													
Length of confinement	None	MIN	-6.6	-10.2	3.6	-4.2	-2.4	-6.3	.3	-7.9	1.3	-15.2	8.6[a]
		MAX	4.6	8.0	3.4	9.1	4.5	9.4	4.8	14.6	10.0[a]	8.8	4.2
Nature of discharge	None	MIN	-3.3	-7.7	4.4a	-6.6	3.3	-6.0	2.7	-11.8	8.5	-7.3	4.0
		MAX	4.7	5.6	.9	10.4	5.7	6.8	2.1	11.6	6.9	7.8	3.1
Reduction in confinement	None	MIN	-6.6	-10.2	3.6	-3.8	-2.8[b]	-4.4	-2.2[b]	-7.9	1.3	-15.2	8.6[a]
		MAX	6.3	6.0	-.3	4.0	-2.3	5.5	-.8	9.9	3.6	14.3	8.0

[a]Largest difference increase from base case for control factor.
[b]Largest difference decrease from base case for control factor.
[c]Greatest value increase from base case for all control factors.

d. Assessment Procedure. The assessment of the effect of the control on the base case results is conducted separately for each control factor, using the "Diff" data in Table 4-5. The effect of the control is determined in a series of steps as follows:

- **Step 1. Common Mode.** Confirm that the common mode present in the base case is retained across all levels in the control variable case, as indicated by the entry "None" in the Common Mode Shift column.

- **Step 2. Largest Difference Increase.** Establish the largest increase in the percentage difference in treatment from the base case results for each factor. This is done by inspecting the values in the "Diff" column for the factor. The largest positive (+) value is reported as the largest difference increase.

- **Step 3. Largest Difference Decrease.** Establish the largest decrease in the percentage difference in treatment from the base case results for the factor. This is done by inspecting the values in the "Diff" column for each factor. The largest negative (-) value is reported as the largest difference decrease.

- **Step 4. Greatest Control Effect.** Establish the largest increase in the value (magnitude) of the percentage difference from the base case, considering all the controls. This is done by inspecting all the "Value" columns for all the control factors. The largest value (+ or -) is reported as the greatest control effect.

e. Assessment of Individual Controls. The effects of each of the control factors in producing the largest increases and decreases from the base case are described in the following paragraphs.

(1) Common Mode Shift. As shown in Table 4-5 by the "None" entries for each factor under in the "Common Mode Shift" column, the common mode for each factor, as identified in the base case, is retained across all the levels of the each control factor.

(2) Control for GENDER

(a) Largest Difference Increase. The largest increase in percentage difference in treatment for the GENDER control is 4.4 percent for the factor NATURE OF DISCHARGE. This value has been identified with the superscript "a" in the Gender/Diff column in Table 4-5. Inspection of Appendix G (Tables G-1, G-2, G-3) indicates that this difference is associated with Black female soldiers, in cases where discharge from the service was not imposed. As shown in the Gender/Value column of Table 4-5, these Black soldiers are disproportionately represented over their White counterparts by -7.7 percent.

(b) Largest Difference Decrease. The largest decrease in percentage difference in treatment for the GENDER control is -1.2 percent for the factor PLEA TO CHARGES. This value has been identified with the superscript "b" in the Gender/Diff column in Table 4-5. Inspection of Appendix G (Tables G-1, G-2, G-3) indicates that this difference is associated with Black female soldiers, in cases involving not guilty pleas. As shown in the Gender/Value column in Table 4-5, these Black female soldiers are disproportionately represented over their White counterparts by -11.8 percent.

(3) Control for AGE Factor

(a) Largest Difference Increase. The largest increase in percentage difference in treatment for the AGE control is 9.8 percent for the factor NATURE OF HIGHEST CHARGE. This value has been identified with the superscript "a" in the Age/Diff column in Table 4-5. Inspection of Appendix G (Tables G-1, G-2, G-4) indicates that this difference is associated with 18- to 19-year-old White soldiers, in cases involving crime against military order. As shown in the Age/Value column in Table 4-5, these White soldiers are disproportionately represented over their Black counterparts by 14.0 percent.

(b) Largest Difference Decrease. The largest decrease in percentage difference in treatment for the AGE control is -2.8 percent for the factor REDUCTION IN CONFINEMENT. This value has been identified by the superscript "b" in the Age/Diff column in Table 4-5. Inspection of Appendix G (Tables G-1, G-2, G-4) indicates that this difference is associated with 26- to 27-year-old Black soldiers, in cases involving sentence reductions of 75 percent or more. As shown in the Age/Value column in Table 4-5, these Black soldiers are disproportionately represented over their White counterparts by -3.8 percent.

(4) Control for SERVICE Factor

(a) Largest Difference Increase. The largest increase in percentage difference in treatment for the SERVICE control is 7.1 percent for the factor NATURE OF HIGHEST CHARGE. This value has been identified by the superscript "a" in the Service/Diff column in Table 4-5. Inspection of Appendix G (Tables G-1, G-2, G-5) indicates that this difference is associated with White soldiers with service periods of 24-47 months in cases involving crimes against military order. As shown in the Service/Value column in Table 4-5, these White soldiers are disproportionately represented over their Black counterparts by 11.3 percent.

(b) Largest Difference Decrease. The largest decrease in percentage difference in treatment for the SERVICE control is -2.2 percent for the factor REDUCTION IN CONFINEMENT. This value has been identified by the superscript "b" in the Service/Diff column in Table 4-5. Inspection of Appendix G (Tables G-1, G-2, G-5) indicates that this difference is associated with Black soldiers with service periods of 96 or more months in cases involving sentence reductions of 75 percent or more. As shown in the Service/Value column in Table 4-5, these Black soldiers are disproportionately represented over their White counterparts by -4.4 percent.

(5) Control for EDUCATION Factor

(a) Largest Difference Increase. The largest increase in percentage difference in treatment for the EDUCATION control is 10.0 percent for the factor LENGTH OF CONFINEMENT. This value has been identified with the superscript "a" in the Education/Diff column in Table 4-5. Inspection of Appendix G (Tables G-1, G-2, G-6) indicates that this difference is associated with White soldiers with some high school, in cases where no confinements are imposed. As shown in the Education/Value column in Table 4-5, these White soldiers are disproportionately represented over their Black counterparts by -14.6 percent.

(b) Largest Difference Decrease. The control for EDUCATION, as shown by the absence of a supercript "b" in the Education/Diff column in Table 4-5, does not produce a decrease from the results obtained in the base case.

(6) Control for SCORE Factor

(a) Largest Difference Increase. The largest increase in percentage difference in treatment for the SCORE control is 8.6 percent, and occurs twice, once for the factor LENGTH OF CONFINEMENT, and once for the factor REDUCTION IN CONFINEMENT. These values have been identified by the superscript "a" in the Score/Diff column in Table 4-5. Inspection of Appendix G (Tables G-1, G-2, G-7) indicates the LENGTH OF CONFINEMENT difference is associated with Black soldiers who score 115 or above in the General Technical Test, in cases involving no confinement. As shown in the Score/Value column in Table 4-5, these Black soldiers are disproportionately represented over their White counterparts by -15.2 percent. Inspection of the Appendix G tables for the factor REDUCTION IN CONFINEMENT indicates this difference is associated with Black soldiers who score 115 or above in the General Technical Test in cases where confinement is suspended. In this instance, the same data is reflected in two different measures. No confinement in the LENGTH OF CONFINEMENT factor is identical to the suspended confinement in the REDUCTION IN CONFINEMENT factor.

(b) Largest Difference Decrease. The control for SCORE, as shown by the absence of a superscript "b" in the Score/Diff column in Table 4-5, does not produce a decrease from the results obtained in the base case.

(7) Greatest Control Effect. Across all control factors, the largest increase in the value (magnitude) of the percentage difference was from 13.3 to 20.7 percent associated with the MIN value for the factor PRETRIAL AGREEMENT when controlled for SCORE. This value is identified by superscript "c" in the Score/Value column in Table 4-5. Inspection of Appendix G (Tables G-1, G-2, G-7) indicates this difference is associated with Black soldiers who score 115 or above in the General Technical Test in cases involving no pretrial agreements.

f. Summary of Control Factor Assessments. The use of controls in the three-way cross-tabulations generated maximum and minimum values, which varied from the base case results observed in the two-way cross-tabulations, as follows:

(1) In each of the control cases, the common mode of the control case for a process factor remained at the same factor level as in the base case. This assures that use of the controls does not produce any changes which radically affect the largest of the racial percentage groups of offenders, as observed in the base case.

(2) The largest difference increase from the base case was 10.0 percent and was associated with the factor LENGTH OF CONFINEMENT, when the factor was controlled for EDUCATION (paragraph 4-4e(5)).

(3) The largest difference decrease from the base case was 2.8 percent and was associated with the factor REDUCTION IN CONFINEMENT, when the factor was controlled for AGE (paragraph 4-4e(3)).

(4) The greatest control effect was the increase from 13.3 percent in the base case to 20.7 percent and was associated with the factor PRETRIAL AGREEMENT, when the factor was controlled for SCORE (paragraph 4-4e(7)).

(5) On balance, the variations introduced by the controls, ranging from an increase in difference of 10.0 percent, to a decrease in difference of 2.8 percent from the base case results, somewhat magnify, but do not generally depart from, the pattern of the results (ranking of the differences) observed in the base case.

4-5. YEAR-BY-YEAR ASSESSMENT

a. Purpose of Assessment. This assessment provides a further examination of the SOLDIER factor of RACE and the PROCESS factors, this time examining the court-martial data a fiscal year at a time. Of the 11 PROCESS factors considered in the multiyear assessment, this assessment focuses on the same 7 factors used in the preceding multiyear assessment with controls. By examining the data in smaller, fiscal year, sets, possibly trends across time by racial group may be identified.

b. Generation of Data. Successive two-way cross-tabulations of RACE versus PROCESS factors for each FY were generated. The volume of data generated, while smaller than the number of runs employed in the three-way cross-tabulations (paragraph 4-4), is similarly awkward to inspect. As a consequence, it also was held in a computer data file and inspected on a monitor using a list utility. These individual fiscal year cross-tabulations are not documented in this report.

c. Presentation of the Data. The results of the year-by-year cross-tabulations are summarized into a single table (Table 4-6) for convenience in assessing the effect of the fiscal year variations. The table is organized in a manner identical to that in Table 4-5 used to summarized the effects of the controls, except that the columns used to distinguish among the results for the control factors now reflect the results by individual fiscal year. With this commonality in mind, reference should be made to paragraph 4-4c for any reminder of the content of the table columns, apart from the substitution of fiscal year results to replace the control factor results. As before, these measures, and specifically the Diff values, provide the basis for assessing the effects of the fiscal year variations on the base case differences, as described in paragraph 4-5d.

d. Assessment Procedure

(1) Assessment Steps. The assessment of the effect of the control on the base case results is conducted on a factor-by-factor basis for each control factor, using the "Diff" data in Table 4-6. The effect of the control is determined in a series of steps as follows:

> **Step 1.** Confirm that the common mode present in the base case is retained across all levels in the control variable case, as indicated by the entry "None" in the Common Mode Shift column.
>
> **Step 2.** Establish the largest increase in the percentage difference in treatment from the base case results for each fiscal year. This is done by inspecting the values in the Diff column for each FY. The largest positive (+) value is reported as the largest increase.

Step 3. Establish the largest decrease in the percentage difference in treatment from the base case results for each fiscal year. This is done by inspecting the values in the Diff column for the factor. The largest negative (-) value is reported as the largest decrease.

Step 4. Greatest fiscal year effect. Establish the largest increase in the value (magnitude) of the percentage difference from the base case, considering all the fiscal years. This is done by inspecting all the Value columns for all the fiscal years. The largest value (+ or -) is reported as the greatest fiscal year effect.

Table 4-6. Treatment Differences by Fiscal Year

Process Factor	Common Mode Shift	Type of Value	Bases Case Values	Factor Values & Control Differences by Control Factor											
				FY 87		FY 88		FY 89		FY 90		FY 91		FY 92	
				Value	Diff	Value	Diff	Value	Diff	Value	Diff	Value	Diff	Value	Diff
Trial Charge Factors															
Nature of highest charge	None	MIN	-4.5	-6.8	2.3	-4.8	.3	-2.8	-1.7	-3.5	-1.0	-3.5	-1.0	-4.0	-.5
		MAX	4.2	7.0	2.8	4.2	.0	4.8	.6[a]	4.0	-.2	8.5	4.3[a]	6.5	2.3[a]
Trial Process Factors															
Plea to charges	None	MIN	-13.0	-12.7	-.3	-14.6	1.6	-12.4	-.6	-12.5	-.5	-14.4	1.4	-9.7	-3.3[b]
		MAX	13.6	14.4	.8	15.3	1.7	10.5	-3.1[b]	15.2	1.6[a]	14.1	.5	10.4	-3.2
Pretrial agreement	None	MIN	-13.3	-12.7	-.6[b]	-16.4[c]	3.1[a]	-11.1	-2.2	-11.7	-1.6	-14.1	.8	-13.5	.2
		MAX	8.1	7.1	-1.0	10.1	2.0	8.4	.3	5.9	-2.2[b]	8.8	.7	7.6	-.5
Type of trial board	None	MIN	-6.4	-8.4	2.0	-7.8	1.4	-5.4	-1.0	-5.6	-.8	-5.2	-1.2	-4.9	-1.5
		MAX	6.2	7.4	1.2	7.8	1.6	4.5	-1.7	5.2	-1.0	6.0	-.2	4.8	-1.4
Trial Outcome Factors															
Length of confinement	None	MIN	-6.6	-6.3	-.3	-6.1	-.5[b]	-6.8	.2	-7.2	.6	-7.4	.8	-5.9	-.7
		MAX	4.6	7.7	3.1	3.6	-1.0	5.0	.4	4.3	-.3	2.9	-1.7	3.7	-.9
Nature of discharge	None	MIN	-3.3	-5.6	2.3	-3.0	-.3	-3.0	-.3	-3.5	.2	-3.7	.4	-4.3	1.0
		MAX	4.7	9.4	4.7[a]	4.5	-.2	3.2	-1.5	5.4	.7	2.4	-2.3[b]	4.1	-.6
Reduction in confinement	None	MIN	-6.6	-6.3	-.3	-6.1	-.5[b]	-6.8	.2	-7.2	.6	-7.4	.8	-5.9	-.7
		MAX	6.3	5.1	-1.2	6.9	.6	6.8	.5	7.4	1.1	5.3	-1.0	4.8	-1.5

[a]Largest difference increase from base case for fiscal year.
[b]Largest difference decrease from base case for fiscal year.
[c]Greatest value increase from base case for all fiscal years.

e. Assessment of Individual Controls. The effects of the fiscal year results in producing the largest increases and decreases from the base case are described in the following paragraphs.

(1) Common Mode Shift. As shown in Table 4-6 by the "None" entries for each factor under in the Common Mode Shift column, the common mode for each factor, as identified in the base case, is retained across all fiscal years.

(2) Fiscal Year 1987

(a) Largest Difference Increase. The largest increase in percentage difference in treatment for FY 87 is 4.7 percent, for the factor NATURE OF DISCHARGE. This value has been identified with the superscript "a" in the FY 87/Diff column in Table 4-6. Inspection of FY 87 data file indicates that this difference is associated with White soldiers in cases where a bad conduct discharge was imposed. As shown in the FY 87/Value column of Table 4-6, these White soldiers are disproportionately represented over their Black counterparts by 9.4 percent.

(b) Largest Difference Decrease. The largest decrease in percentage difference in treatment for FY 87 is -.6 percent, for the factor PRETRIAL AGREEMENT. This value has been identified with the superscript "b" in the FY 87/Diff column in Table 4-6. Inspection of FY 87 data file indicates that this difference is associated with Black soldiers in cases where no pretrial agreement was present. As shown in the FY 87/Value column in Table 4-6, these Black soldiers are disproportionately represented over their White counterparts by 12.7 percent.

(3) Fiscal Year 1988

(a) Largest Difference Increase. The largest increase in percentage difference in treatment for FY 88 is 3.1 percent, for the factor PRETRIAL AGREEMENT. This value has been identified with the superscript "a" in the FY 88/Diff column in Table 4-6. Inspection of the FY 88 data file indicates that this difference is associated with Black soldiers in cases where no pretrial agreement was present. As shown in the FY 88/Value column in Table 4-6, these Black soldiers are disproportionately represented over their White counterparts by 16.4 percent.

(b) Largest Difference Decrease. The largest decrease in percentage difference in treatment for FY 88 is -.5 percent and occurs both for the factor LENGTH OF CONFINEMENT and the factor REDUCTION IN CONFINEMENT. The two occurrences are identified by the superscript "b" in the FY 88/Diff column in Table 4-6. Inspection of the FY 88 data file indicates that both differences are associated with Black soldiers, in cases involving a suspension of confinement and as a consequence, no period of confinement was involved. As shown in the FY 88/Value column in Table 4-6, these Black soldiers are disproportionately represented over their White counterparts by 6.1 percent.

(4) Fiscal Year 1989

(a) Largest Difference Increase. The largest increase in percentage difference in treatment for FY 89 is 0.6 percent for the factor NATURE OF HIGHEST CHARGE. This value has been identified by the superscript "a" in the FY 89/Diff column in Table 4-6. Inspection of the FY 89 data file indicates that this difference is associated with White soldiers in cases involving crimes against military order. As shown in the FY 89/Value column in Table 4-6, these White soldiers are disproportionately represented over their Black counterparts by 4.8 percent.

(b) Largest Difference Decrease. The largest decrease in percentage difference in treatment for FY 89 is 3.1 percent for the factor PLEA TO CHARGES. This value has been identified by the superscript "b" in the FY 89/Diff column in Table 4-6. Inspection of the FY 89 data file indicates that this difference is associated with White soldiers in cases where a guilty plea was entered. As shown in the FY 89/Value column in Table 4-6, these White soldiers are disproportionately represented over their Black counterparts by 10.5 percent.

(5) Fiscal Year 1990

(a) Largest Difference Increase. The largest increase in percentage difference in treatment for FY 90 is 1.6 percent for the factor PLEA TO CHARGES. This value has been identified with the superscript "a" in the FY 90/Diff column in Table 4-6. Inspection of the FY 90 data file indicates that this difference is associated with White soldiers in cases where a guilty plea was involved. As shown in the FY 90/Value column in Table 4-6, these White soldiers are disproportionately represented over their Black counterparts by 15.2 percent.

(b) Largest Difference Decrease. The largest decrease in percentage difference in treatment for FY 90 is 2.2 percent for the factor PRETRIAL AGREEMENT. This value has been identified with the superscript "b" in the FY 90/Diff column in Table 4-6. Inspection of the FY 90 data file indicates that this difference is associated with White soldiers in cases where a standard pretrial agreement was involved. As shown in the FY 90/Value column in Table 4-6, these White soldiers are disproportionately represented over their Black counterparts by 5.9 percent.

(6) Fiscal Year 1991

(a) Largest Difference Increase. The largest increase in percentage difference in treatment for FY 91 is 4.3 percent for the factor NATURE OF HIGHEST CHARGE. This value has been identified with the superscript "a" in the FY 91/Diff column in Table 4-6. Inspection of the FY 91 data file indicates that this difference is associated with White soldiers in cases where a crime against the general order is involved. As shown in the FY 91/Value column in Table 4-6, these White soldiers are disproportionately represented over their Black counterparts by 8.5 percent.

(b) Largest Difference Decrease. The largest decrease in percentage difference in treatment for FY 91 is 2.3 percent, for the factor NATURE OF DISCHARGE. This value has been identified with the superscript "b" in the FY 91/Diff column in Table 4-6. Inspection of the FY 91 data file indicates that this difference is associated with White soldiers, in cases where a dishonorable discharge from the service was involved. As shown in the FY 91/Value column in Table 4-6, these White soldiers are disproportionately represented over their Black counterparts by 2.4 percent.

(7) Fiscal Year 1992

(a) Largest Difference Increase. The largest increase in percentage difference in treatment for FY 92 is 2.3 percent, for the factor NATURE OF HIGHEST CHARGE. This value has been identified with the superscript "a" in the FY 92/Diff column in Table 4-6. Inspection of the FY 92 data file indicates that this difference is associated with White soldiers, in cases where a crime against the general order was

involved. As shown in the FY 92/Value column in Table 4-6, these White soldiers are disproportionately represented over their Black counterparts by 6.5 percent.

(b) Largest Difference Decrease. The largest decrease in percentage difference in treatment for FY 92 is 3.3 percent, for the factor PLEA TO CHARGES. This value has been identified with the superscript "b" in the FY 92/Diff column in Table 4-6. Inspection of the FY 92 data file indicates that this difference is associated with Black soldiers, in cases where a plea of not guilty was entered. As shown in the FY 90/Value column in Table 4-6, these Black soldiers are disproportionately represented over their White counterparts by 9.7 percent.

(8) Greatest Fiscal Year Effect. Across all the fiscal years, the largest increase in the value (magnitude) of the percentage difference was from 13.3 to 16.4 percent associated with the MIN value for the factor PRETRIAL AGREEMENT in FY 88. This value is identified by superscript "c" in the FY 88/Value column in Table 4-6. Inspection of the computer data file for the FY 88 cross-tabulations results indicates this difference is associated with Black soldiers in cases involving no pretrial agreements.

f. Summary of Fiscal Year Assessments. The individual fiscal year results generated maximum and minimum values, which varied from the base case results as follows:

(1) In each of the control cases, the common mode of the control case for a process factor remained at the same factor level as in the base case. This assures that use of the conditions in any one individual fiscal year did not depart from the group of years as a whole.

(2) The largest increase from the base case was 4.3 percent and was associated with the factor NATURE OF HIGHEST CHARGE in FY 91 (paragraph 4-5e(6).

(3) The largest decrease from the base case was 3.3 percent and was associated with the factor PLEA TO CHARGES in FY 92 (paragraph 4-5e(7).

(4) The greatest fiscal year effect was the increase from 13.3 percent in the base case to 16.4 percent and was associated with the factor PRETRIAL AGREEMENT (paragraph 4-4e(8)).

(5) On balance, the variations across the fiscal years, ranging from an increase in difference of 4.3 percent, to a decrease in difference of 3.3 percent from the base case results, do not generally depart from the trend of the results (rank of differences) observed in the base case.

4-6. OBSERVATIONS ON FACTOR-PAIR ASSESSMENTS. The three families of cross-tabulations (multiyear, multiyear with controls, and year by year) yielded comparable results, which are summarized as follows:

a. Multiyear Assessment. The evaluation of the court-martial trial process, as characterized by the 11 factors selected from the court-martial case records (Table 4-4) showed that the largest magnitudes of the treatment differences for these factors was a difference of 13.6 percent, associated with White offenders pleading guilty more often than Black offenders, and the reciprocal difference of 13.0 percent associated with Black offenders pleading not guilty more often than White offenders.

b. Multiyear Assessment with Controls. When controls for the gender, age, service time, civilian education, and general technical score were applied to the trial process factors and compared with the corresponding base case results, both increases and decreases from the base case results were observed. The greatest control effect was the increase from 13.3 percent in the base case to 20.7 percent, associated with the factor PRETRIAL AGREEMENT, when the factor was controlled for SCORE. However, the pattern of these differences did not generally depart from the trend of the differences in the base case.

c. Year-by-year Assessment. When the individual fiscal years were examined individually and compared with the corresponding results in the base case, both increases and decreases from the base case results were observed. The greatest effect was the increase from 13.3 percent in the base case to 16.4 percent, and again was associated with the factor PRETRIAL AGREEMENT in FY 1988. It is noted that this is the same factor had the greatest control effect (as reported above). However, the pattern of these differences did not generally depart from the trend of the differences in the base case.

d. Representative Assessment. Based on the relatively small variations in results with the use of controls and the similarly small variations in results by fiscal year, the base case results for the period FY 1987-1992 are taken to appropriately represent the conditions in the court-martial process for the overall assessment of factor-pair differences in treatment.

CHAPTER 5

ASSESSMENT OF TREATMENT USING FACTOR-SETS

5-1. INTRODUCTION. This chapter examines the issue of difference in treatment in the judicial process using the statistical technique of discriminant analysis. This technique considers multiple factors at a time and seeks to identify the factor conditions which are associated with group membership, which, in the present analysis, refers to membership in the groups of White and Black offenders.

5-2. DISCRIMINANT ANALYSIS TECHNIQUE

a. Discriminant Groups. The discriminant analysis technique used in this assessment was first proposed by R. A. Fisher in 1936 as a statistical tool for distinguishing among groups in classification situations. In the present analysis, the groups are Black and White enlisted personnel accused of crimes and brought before tribunals of the Army justice system. The analysis seeks to identify the most significant variables drawn from court-martial case records which distinguish membership in these groups and the extent of their contribution.

b. Discriminant Analysis Model. The discriminant analysis model is a linear combination of n variables (x), each with weights (a), used to predict membership in a group (Y) (Ref 5). The model has the form:

$$Y = a_1 x_1 + a_2 x_2 + \ldots + a_n x_n + U$$

where:

x = variables associated with factors selected for use in model

a = coefficients of variable

U = constant

with values for centroids (which measure the central tendency of the group) for representing each of the groups present (Black and White). Each centroid is given in both magnitude and sign.

c. Coefficient Interpretation

(1) Group Membership. The task of the analysis is determine and then interpret the group membership implications of each of the variable coefficients in the discriminant analysis model. Since the model assesses tendencies towards group membership, the coefficients must first be related to the group representation in the model. This representation is in the form of a centroid about which the instances of group membership are considered to be clustered. The centroid is measured by a mean value, with one mean for White (with sign) and one mean for Black (with opposite sign). A variable is correlated with a group by comparing the sign of the variable coefficient with the sign of the two centroid means. Where the variable coefficient has the same sign as the centroid mean, the variable is associated with

membership in that group. That is, as the value of the variable increases, the value of the discriminant function moves toward that centroid. It should be noted that the characteristics of the data set determine the signs of the centroid means, so that a particular sign cannot be consistently associated with a particular group.

(2) Contribution Within Group Membership. Having established that a particular variable assesses tendency toward a particular group, the relative contribution of the variable, among the several variables associated with the group, can be determined. This is done by normalizing each of the variable coefficients with respect to its standard deviation. Each coefficient so normalized is referred to as the "standard coefficient" for the variable. This standardization allows the coefficients in the model to be ranked for their relative importance in assessing group tendency. The ranking of the coefficients is based on the absolute magnitude of the coefficients, with the largest magnitude ranked first.

5-3. DISCRIMINANT ANALYSIS SIGNIFICANCE CRITERIA

a. Chi-square Criterion. Since there are only two groups, the analysis always produces only one discriminant function, independent of the number of factors used. The traditional Chi Square is used as one criteria to establish the significance of the function. If k is the number of groups, and P is the number of variables in the function, then the Chi Square has P(k-1) degrees of freedom. In the case with k=2 groups, this becomes simply P degrees of freedom. If the discriminant function is significant at some "α" level, this is the same as saying that there is a significant difference at the "α" level between the two group centroids (means) of the discriminant function. The eigenvalue corresponding to the discriminant function is also computed and then used to compute the total discriminatory power criteria described in the following paragraph.

b. Total Discriminatory Power Criterion. The second criterion used to evaluate alternative combinations of variables is total discriminatory power (TDP) (after Tatsuoka (1970) (Ref 5)). This measure gives an estimate of the true variability of scores that can be attributed to group differences. Let W (which computes to a percent) denote the TDP of some discriminant function, then W percent of the variability in the discriminant space is relevant to group differentiation. That is, W percent of the total variability of the discriminant function is attributable to group differentiation. For the two-group, P-variable models, the TDP is computed as shown below.

Total Discriminatory Power

$$W = 1 - (N / ((N - 2)(1 + L) + 1))$$

where:

W = total discriminatory power
N = total number of cases (both groups) in data set
L = eigenvalue computed for discriminant function

5-4. DISCRIMINANT ANALYSIS PROCESS

a. Preliminary Analysis. A preliminary analysis assessing the factor variability of the numeric SOLDIER and PROCESS factors was carried out (Appendix E). This preliminary analysis modeled each of the factors separately, for each of the fiscal years, and determined a set of TDP values for each factor, acting separately, as a group discriminator. From this preliminary examination of these individual factor TDP sets, the following SOLDIER factors were selected for use in the final analysis (paragraph 5-4b). It should be noted that no PROCESS factors were selected (see Appendix E) for inclusion in the final analysis.

- AGE - age of accused at time of court-martial
- EDUCATION - years of education of accused
- SCORE - score achieved on General Technical Test
- SERVICE - years of service in Army at time of court-martial

b. Final Analysis. The final discriminant analysis was conducted on the full (12711 cases) data set, using the STATGRAPHICS software package, and the produced the discriminant analysis model shown in Exhibit 5-1. Included in the exhibit are the standardized coefficients (STD COEFF) and the rank of these coefficients (COEFF RANK).

Exhibit 5-1. Discriminant Analysis Model

$$Y = a_1x_1 + a_2x_2 + a_3x_3 + a_4x_4 + U$$

Index i	xi	ai	STD COEFF	COEFF RANK
1	AGE	-.08884	-.52706	2
2	EDUCATION	-.15279	-.21946	3
3	SCORE	.05576	.88082	1
4	SERVICE	-.01973	-.09569	4

Centroids: Group(Black) = -.32892 ; Group(White) = .30044

N = 12177 cases; P-value = .0000 ; W = 9.0% (TDP)

5-5. DISCRIMINANT ANALYSIS RESULTS

a. Individual Factor Results. The individual factor results, as interpreted from the model results shown in Exhibit 5-1, are as follows:

(1) SCORE Factor. With the largest standard coefficient in the model ($a_3 = +0.88082$), the General Technical Score is the strongest model factor predictor for group membership. The sign of the SCORE coefficient is the same as that for the

centroid mean for Group (White), namely +0.30044. The same sign indicates that the SCORE factor is positively correlated with the group mean for White group membership. That is, the higher the GT Score, the greater the likelihood the offender is a White soldier.

(2) AGE Factor. With the next largest standard coefficient in the model (a_1 = -0.52706), AGE is the 2nd strongest model factor predictor for group membership. The sign of the AGE coefficient is the same as that for the centroid mean for Group (Black), namely -0.32892. The same sign indicates that the AGE factor is positively correlated with the group mean for Black group membership. That is, the older the offender, the greater the likelihood the offender is a Black soldier.

(3) EDUCATION Factor. With the next largest standard coefficient in the model (a_2 = -0.21946), EDUCATION is the 3rd strongest model factor predictor for group membership. The sign of the EDUCATION coefficient is the same as that for the centroid mean for Group (Black), namely -0.32892. The same sign indicates that the EDUCATION factor is positively correlated with the group mean for Black group membership. That is, the more educated the offender, the greater the likelihood the offender is a Black soldier.

(4) SERVICE Factor. With the next largest standard coefficient in the model (a_4 = -0.09569), SERVICE is the 4th strongest model factor predictor for group membership. The sign of the SERVICE coefficient is the same as that for the centroid mean for Group (Black), namely -0.32892. The same sign indicates that the SERVICE factor is positively correlated with the group mean for Black group membership. That is, the longer the military service of the offender, the greater the likelihood the offender is a Black soldier.

b. Summary of Relationships. The group membership tendencies as derived for the discriminant analysis model, in the order of their prominence, are as follows:

- The higher the GT Score, the greater the likelihood the offender is a White soldier.
- The older the offender, the greater the likelihood the offender is a Black soldier.
- The more educated the offender, the greater the likelihood the offender is a Black soldier.
- The longer the military service of the offender, the greater the likelihood the offender is a Black soldier.

c. Significance of Results. As shown in Exhibit 5-1 the discriminant function has a P-value of 0.0000 which asserts a highly significant difference between the two group centroids. However, the TDP value of 9.0 percent shown in the exhibit, indicates that only 9.0 percent of the total variability of the discriminant function is attributable to group differentiation. This means that the findings of discrimination power among the PROCESS factors, while statistically significant, are not strong predictors of group membership. More to the point of the study of the trial process, all of the PROCESS factors descriptive of the trial process were excluded during the preliminary analysis (paragraph 5-4a) for failure to exhibited sufficient discriminatory power to be included in the final analysis. Thus, neither the SOLDIER factors or

the PROCESS have evidenced strong predictive power. This lack of predictive power for group membership is explored further in the following paragraph.

5-6. CONFIRMATION OF DISCRIMINANT ANALYSIS RESULTS

a. Issue. The results of the discriminant analysis shown in Exhibit 5-1 show a relatively small value (9.0 percent) for the Total Discriminatory Power for the model. The TDP measure, as constructed by Tatsuoka (paragraph 5-3b), computes the percent of the total variability of the discriminant function which is attributable to group differentiation. The more variation explained, the more useful the model results. With the small value of 9.0 percent present in Exhibit 5-1, the question arises as to whether the limitation of the discrimination analysis to numeric values (only 5 of the 11 PROCESS factors are numeric), adversely affected the outcome of the factor set analysis by excluding possible contributions by the remaining 6 nonnumeric PROCESS factors.

b. Approach. At the suggestion of Dr. Gerald H. Andersen of the Army Research Office (ARO), Dr. Wie-Yin Loh of the University of Wisconsin, a consultant to ARO, was afforded the opportunity to apply his recently developed tree-structured methodology to the study data, for insights it might afford in support of the discriminant analysis methodology used in the study. The tree-structured analysis is a generalized discriminant analysis method using computer-search for assessing group affiliation which incorporates both numeric and nonnumeric data. Inclusion of the nonnumeric PROCESS factor data would fill a methodological gap. It would be useful, therefore, to run the tree-structured analysis to generate results directly comparable the CAA model. The study sponsor was consulted and agreed to the release of the study data for this analysis, caveating its release solely for study purposes.

c. Tree-structured Statistical Methodology. Each of the decision trees shown in the report is obtained by applying a classification algorithm to the data. The goal of the algorithm is to partition the data into regions (indicated by the terminal nodes of the tree) such that the data are as homogeneous as possible with respect to the class variable (the soldier's race in this application). Because of the level of "noise" in the data, special precautions are taken to avoid overpartitioning. The algorithm consists of two basic steps:

(1) Split Selection. The purpose of this step is to find the variable along which the data must separate into two classes according to race. At each node of the tree, statistical *t*-tests for differences between the sample means and variances of the two classes are computed for each variable. The variable with the most statistically significant *t*-test is selected to split the node. The splitting value is the midpoint between the two sample class means.

(2) Tree Size Determination. The purpose of this step is to determine the appropriate amount of partitioning of the data so that under- and oversplitting are avoided. The splitting algorithm is first carried out recursively until the data in each terminal node are of the same class (race). This overly large tree is then pruned back by removal of some branches using a process of "cross-validation" (Appendix H, References, Bremen et al. (1984)). In the pruning phase, the data are randomly divided into 10 subsets of roughly equal sizes. The splitting algorithm is applied to nine of these subsets to produce trees of varying lengths. An estimate of the misclassification rate of each tree is obtained by testing it against the subset that was

set aside. By repeating this process 10 times, leaving out a different subset each time, an estimate of the amount of pruning to be used on the original tree is obtained.

d. Results Using Tree-structured Analysis. The report of this work is reproduced in Appendix H. The predictive character of each of the PROCESS and SOLDIER factors (numeric and nonnumeric) by fiscal year and all fiscal years (FYall) from this analysis are summarized in Table 5-1. For comparison, the predictive character of the factors determined by the discriminant analysis (FYall) are also shown.

Table 5-1. Comparison of Discriminant and Tree-structured Analysis

Factor	Discriminant Analysis[a]	Tree-structured Analysis[b]					
	FYall	FY87	FY88	FY89	FY90	FY91	FY92
Trial Process Factors (-P- = predicting factor, N = nonpredicting)							
Number of Charges	N	N	N	N	N	N	N
Time Faced on Charges	N	N	N	N	N	N	N
Nature of Highest Charge	N[c]	N	N	N	N	N	-P-
Plea to Charges	N[c]	-P-	-P-	N	-P-	-P-	N
Pretrial Agreement	N[c]	-P-	N	N	N	N	N
Type Trial	N[c]	N	N	N	N	N	N
Type of Trial Board	N[c]	N	N	N	N	N	N
Length of Confinement	N	N	N	N	N	N	N
Nature of Discharge	N[c]	N	N	N	N	N	-P-
Reduction in Charges	N	N	N	N	N	N	N
Reduction in Confinement	N	N	N	N	N	N	N
Soldier Factors (-P- = predicting factor, N = nonpredicting)							
Race	d	d	d	d	d	d	d
Age	-P-	-P-	-P-	P-	-P-	-P-	N	-P-
Gender	N[c]	N	-P-	N	N	N	N	N
Education	-P-	-P-	-P-	N	N	N	-P-	N
Score	-P-	-P-	-P-	-P-	-P-	-P-	-P-	-P-
Service	-P-	-P-	-P-	-P-	N	-P-	N	-P-

[a]Analysis determined TDP of 9.0 percent.

[b]Analysis determined misclassification rate of 35 percent for all FY and range of 32-38 percent by FY.

[c]Nonnumeric factor, not amenable to discriminant analysis.

[d]Factor used to identify, not predict, group membership in the analysis.

d. Comparison of Results

(1) Comparison of PROCESS Factor Results. As shown in Table 5-1, when all 6 years of data are used, the tree-structured analysis considered and rejected all 11 trial process factors and is in agreement with the discriminant analysis finding which rejected all 5 of the numeric trial process factors considered. As also shown in Table 5-1, the tree-structured analysis found instances of trial process predictive factors in the individual years but these instances fail to reappear when all 6 years of data are used.

(2) Comparison of SOLDIER Factor Results. Both the discriminant and tree-structured analyses ascribe predictive power to four of the five soldier factors namely: Age, Education, Score and Service. As also shown in the table, the tree-structured analysis found these factors consistently identified in the individual years as well all 6 years combined. However, as footnoted in the table, the predictive power of these factors in both the tree-structured and discriminant analyses are weak; with a low TDP value of 9.0 percent for the discriminant analysis and misclassification rate of 35 percent for the tree-structured analysis.

(3) Overall Comparison

- The tree-structured analysis extended the discriminant analysis to include nonnumeric PROCESS factors, but failed to identify any additional predictive factors associated with the trial process.

- Both the discriminant and tree-structured analyses identified the same set of soldier-associated factors, but both analyses found these factors to be weak predictors of group membership.

5-7. OBSERVATIONS ON FACTOR-SET ASSESSMENTS. Both the discriminant and tree-structured analysis yielded essentially the same results which may be summarized as follows:

a. Of the individual offender factors, the soldier factor of GT score is the most discriminating, with Black offenders tending to have lower GT scores than White offenders. The other soldier factors also tend to separate Black from White offenders, namely: age (Black offenders tend to be older), years of service (Black offenders tend to have longer years of service), and years of education (Black offenders tend to have more years of education).

b. However the low value of total discrimination power observed in the discriminate analysis and the high level misclassification rates in the tree-structure analysis suggests that the explanatory factors in the court-martial data are not very informative for discrimination between the races. Expressed differently, and more to the thrust of the study, the court-martial data as so analyzed does not provide substantive evidence of discrimination in the court-martial process.

CHAPTER 6

SUMMARY OF ASSESSMENT APPROACHES

6-1. INTRODUCTION. This chapter summarizes the results generated using the factor-pair (cross-tabulation) approach and the factor-set (discriminant analysis/tree-structured classification) approach. The factor-pair and factor-set approaches are considered complementary, rather than duplicative. The underlying statistical concepts are similar, but they generate results with different orientations. The factor-pair approach focuses on a clear differentiation of individual factors by race, while the factor-set approach identifies tendencies of the factors to favor membership in a particular (racial) group.

6-2. OVERVIEW OF APPROACHES

a. Factor-pair (cross-tabulation). This technique focuses directly on the race of the accused and examines, in turn, the pairing of the RACE factor with each of the factors associated with the trial process (PROCESS factors). This technique provides a direct measure, in the form of frequency counts, of the interaction of each of the PROCESS factors with RACE. Since race membership does not occur equally in court-martial cases, the analysis of the counts is conducted using the percentage distribution of the counts, rather than the counts themselves. This standardizes the comparison across RACE for the unequal numbers by racial group.

b. Factor-set (discriminant analysis). This technique focuses on the factors as a set. It uses a linear combination of SOLDIER and PROCESS factors, equated to RACE, to provide relative measures of the importance of the contribution of the factors to membership in the group of Black offenders or the group of White offenders. This analysis is limited to consideration of factors expressed on numeric scales. To include nonnumeric factors, a newly developed (Appendix H) tree-structure classification technique was used. This classification algorithm attempts to partition the case data at each node so that the split produces subnodes that are much purer (more contrast in ratio of group membership) than the node being split. The classification approach is similar to discriminant analysis, except that only one factor is used at a time, and the procedure is applied in a recursive manner. The method, unlike discriminant analysis, considers both numeric and nonnumeric factors, thereby extending the range of factors considered.

6-3. SUMMARY OF APPROACHES. A comparison of the two approaches is shown in Table 6-1. The comparison: (1) characterizes the approaches in terms of the method of assessment, the scope of the assessment, and the focus sought in establishing the treatment differences, (2) identifies and assesses the findings arising from individual approaches, and (3) arrives at a composite finding based on both approaches.

Table 6-1. Summary of Assessment Approaches

Point of comparison	Factor-pair assessment	Factor-set assessment	
Method of assessment	Cross-tabulation	Discriminant analysis	Tree-structured classification
Scope of assessment	All trial process factors paired with race of offender	Factors in numeric form	Factors in both numeric and nonnumeric form
Findings using method	• Maximum difference across all factors was 13.6%, with a median of 4% • Race associated with differences varies	• Black offenders tend to be older, have more education, and have longer service • White offenders tend to have higher score on general technical test • Group prediction accuracy of models is weak	
Assessment of method findings	Maximum factor differences are small in the context of Black overrepresentation, and not consistently associated with a single race	The failure of the factor-set models to robustly predict group membership suggests that the trial process, as characterized by these factors, is not group sensitive	
Composite of findings	The trial process, as characterized by the factor data, while indicating some differentiations by race, does not suggest any consistent pattern of difference in treatment evidencing inequitable treatment of Black offenders		

APPENDIX A

STUDY CONTRIBUTORS

1. INTERNAL CONTRIBUTORS

Report Analysis and Preparation

Mr. James J. Connelly, Force Systems Directorate

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APPENDIX B

REQUEST FOR ANALYTICAL SUPPORT

REQUEST FOR QUICK REACTION ANALYTICAL SUPPORT

1. Title: Equitableness of Treatment in Army Judicial Proceedings (ETAJUP)

2. Date request received: 13 Jan 93	**3. Due date:** 31 Mar 93	**4. Sponsor:** DAPE-HR

5. Background/statement of problem: (continue on reverse)
Data from the Clerk of Courts and Disciplinary Barracks (confined population) show that minorities are over-represented in the Army's justice system. While this is even more pronounced in the civilian sector, the Army is a selective environment since recruits meet certain entry requirements. This has led interest groups to charge that the Army does not administer justice equitably.

6. Objective(s): (continue on reverse)
Using available data, assess whether minorities are treated equitably in Army judicial (court martial) proceedings. Identify any specific factors in the proceedings data which could imply non-equitable treatment

7. Scope of work: (continue on reverse)
The analysis will use existing judicial proceeding and administrative records of last five years to characterize the charge, penalty, and offender characteristics associated with each case.

8. Issues for analysis: (1) Which case data elements should be used to characterize the charge, penalty and offender to insure recognition of any difference in treatment; (2) For each year's data, are there differences in treatment (a) among soldiers for like offenses, (b) in terms of acquittals vs convictions, and (c) by length of sentence?

9. Product required: Final results briefing and memorandum report to include a study summary, the briefing itself, and identification of the data used.

10. Study Director/POC signature: J. J. Connelly	**Date:** 9 Feb 93
11. Deputy/Assistant Director concurrence: COL J. B. Harrington	**Date:** 10 Feb 93
12. Sponsor (COL/DA Div Chief) concurrence: COL R. G. Kurtz	**Date:** 9 Feb 93

13. Sponsor comments: (continue on reverse)

(1) CAA is authorized access to Army judicial and administrative data required in support of this analysis. The cooperation of activities in supplying this data is requested and authorizations for access will be provided as appropriate.

(2) CAA is to contact sponsor every two weeks by telephone to update project status.

CAA Form 233
14 Apr 92

Previous editions Obsolete

APPENDIX C

REFERENCES

1. Headquarters Department of the Army, Army Regulation (AR) 27-10, Military Justice, 16 January 1989

2. Manual for Courts-Martial, Appendix 12, Maximum Punishment Chart, 1984

3. Headquarters, Department of the Army, Legal Guide for Commaders, Field Manual (FM) 27-1, January 1992

4. US Army Judiciary, Clerk of Court, Court-martial Case Report Handbook (with changes through 1 March 1993)

5. Tatsuoka, Maurice M., Selected Topics in Advance Statistics, Number 6, Discriminant Analysis, Institute for Personality and Ability Testing, Champaign, IL, 1970

APPENDIX D

CROSS-TABULATION TABLES

INTRODUCTION

a. Content. This appendix contains the cross-tabulation outputs for the SOLDIER variable RACE, identified herein as "V1," with all 11 PROCESS factors, identified herein as "C1 to C3," "P1 to P4," and "R1 to R4."

b. Format. The outputs are in the format generated by the SPSS package. In a number of instances, the tables are folded horizontally to accommodate the number of levels of the factor in question. In these folded cases, the marginal counts and percentages shown refer to the total for the level, not just the numbers present in the immediate (truncated) row.

Cross-tabulation: V1 RACE
By C1 NUMBER OF CHARGES

C1→	Count / Row Pct	SINGLE OFFENSE	2-4 OFFENSES	5-7 OFFENSES	8 OR MORE OFFENSES	Row Total
V1						
WHITE		873	3003	1336	1152	6364
		13.7	47.2	21.0	18.1	52.3
BLACK		773	2721	1189	1130	5813
		13.3	46.8	20.5	19.4	47.7
	Column Total	1646	5724	2525	2282	12177
		13.5	47.0	20.7	18.7	100.0

Number of Missing Observations = 0

Cross-tabulation: V1 RACE
By C2 TIME FACED ON CHARGES

C2→	Count / Row Pct	LESS THAN 5 YEARS	5-10 YEARS	10-15 YEARS	15-20 YEARS	20-25 YEARS	Row Total
V1							
WHITE		825	1397	853	769	572	6364
		13.0	22.0	13.4	12.1	9.0	52.3
BLACK		835	1364	769	688	420	5813
		14.4	23.5	13.2	11.8	7.2	47.7
	Column	1660	2761	1622	1457	992	12177
(Continued)	Total	13.6	22.7	13.3	12.0	8.1	100.0

Cross-tabulation: V1 RACE
By C2 TIME FACED ON CHARGES

C2→	Count / Row Pct	MORE THAN 25 YEARS	Row Total
V1			
WHITE		1948	6364
		30.6	52.3
BLACK		1737	5813
		29.9	47.7
	Column	3685	12177
	Total	30.3	100.0

Number of Missing Observations = 0

Cross-tabulation: V1 RACE
By C3 NATURE OF HIGHEST CHARGE

C3→	Count / Row Pct	MILITARY ORDER	GENERAL ORDER	PERSONS	PROPERTY	ILLEGAL SUBSTANCE	Row Total
V1							
WHITE		1693	2183	1285	288	915	6364
		26.6	34.3	20.2	4.5	14.4	52.3
BLACK		1302	1757	1437	374	943	5813
		22.4	30.2	24.7	6.4	16.2	47.7
	Column	2995	3940	2722	662	1858	12177
	Total	24.6	32.4	22.4	5.4	15.3	100.0

Number of Missing Observations = 0

Cross-tabulation: V1 RACE
By P1 PLEA TO CHARGES

P1→	Count Row Pct	NOT GUILTY	GUILTY-CONTEST	GUILTY	Row Total
V1					
WHITE		1043	678	4636	6357
		16.4	10.7	72.9	52.3
BLACK		1703	657	3440	5800
		29.4	11.3	59.3	47.7
	Column Total	2746	1335	8076	12157
		22.6	11.0	66.4	100.0

311.21364 2 .0000 636.917 None

Number of Missing Observations = 20 (data not present)

Cross-tabulation: V1 RACE
By P2 PRETRIAL AGREEMENT

P2→	Count / Row Pct	NONE	STANDARD	OTHER	Row Total
V1					
WHITE		1713	3348	1053	6114
		28.0	54.8	17.2	52.6
BLACK		2273	2569	662	5504
		41.3	46.7	12.0	47.4
	Column Total	3986	5917	1715	11618
		34.3	50.9	14.8	100.0

Number of Missing Observations = 559 (data not present)

Cross-tabulation: V1 RACE
By P3 TYPE OF TRIAL

P3→	Count / Row Pct	BAD CONDUCT CM	GENERAL CM	SPECIAL CM	Row Total
V1					
WHITE		2174	3929	261	6364
		34.2	61.7	4.1	52.3
BLACK		1942	3518	353	5813
		33.4	60.5	6.1	47.7
	Column Total	4116	7447	614	12177
		33.8	61.2	5.0	100.0

Number of Missing Observations = 0

Cross-tabulation: V1 RACE
By P4 TYPE OF TRIAL BOARD

P4→	Count / Row Pct	UNKNOWN	ENL & OFF	MIL JUDGE	OFFICERS	Row Total
V1						
WHITE		5	971	4759	629	6364
		.1	15.3	74.8	9.9	52.3
BLACK		10	1261	3985	557	5813
		.2	21.7	68.6	9.6	47.7
	Column Total	15	2232	8744	1186	12177
		.1	18.3	71.8	9.7	100.0

Number of Missing Observations = 0

Cross-tabulation: V1 RACE
By R1 LENGTH OF CONFINEMENT

Page 1 of 2

R2→	Count / Row Pct	NONE	LESS THAN 6 MOS	6-12 MOS	12-24 MOS	24-48 MOS	Row Total
V1							
WHITE		940	1900	781	957	979	6364
		14.8	29.9	12.3	15.0	15.4	52.3
BLACK		1245	1473	695	741	871	5813
		21.4	25.3	12.0	12.7	15.0	47.7
	Column	2185	3373	1476	1698	1850	12177
(continued)	Total	17.9	27.7	12.1	13.9	15.2	100.0

Cross-tabulation: V1 RACE
By R2 LENGTH OF CONFINEMENT

Page 2 of 2

R2→	Count / Row Pct	48-96 MOS	96 OR MORE MOS	Row Total
V1				
WHITE		488	319	6364
		7.7	5.0	52.3
BLACK		448	340	5813
		7.7	5.8	47.7
	Column	936	659	12177
	Total	7.7	5.4	100.0

Number of Missing Observations = 0

Cross-tabulation: V1 RACE
By R2 NATURE OF DISCHARGE

R3→	Count / Row Pct	NONE	BAD CONDUCT	DISHONORABLE	DISMISSAL	Row Total
V1						
WHITE		1428	3628	1308		6364
		22.4	57.0	20.6		52.3
BLACK		1494	3039	1279	1	5813
		25.7	52.3	22.0	.0	47.7
	Column Total	2922	6667	2587	1	12177
		24.0	54.8	21.2	.0	100.0

Number of Missing Observations -

Cross-tabulation: V1 RACE
By R3 REDUCTION IN CHARGES

R5→	Count / Row Pct	NO REDUCTION	UP TO 25%	25-50%	50-75%	MORE THAN 75%	Row Total
V1							
WHITE		5404	279	258	202	221	6364
		84.9	4.4	4.1	3.2	3.5	52.3
BLACK		4870	264	257	170	252	5813
		83.8	4.5	4.4	2.9	4.3	47.7
	Column Total	10274	543	515	372	473	12177
		84.4	4.5	4.2	3.1	3.9	100.0

Number of Missing Observations = 0

Cross-tabulation: V1 RACE
By R4 REDUCTION IN CONFINEMENT
Page 1 of 2

R6→	Count / Row Pct	NO REDUCTION	UP TO 25%	25-50%	50-75%	MORE THAN 75%	Row Total
V1							
WHITE		35	46	126	535	4682	6364
		.5	.7	2.0	8.4	73.6	52.3
BLACK		31	22	120	481	3914	5813
		.5	.4	2.1	8.3	67.3	47.7
	Column	66	68	246	1016	8596	12177
(Continued)	Total	.5	.6	2.0	8.3	70.6	100.0

Cross-tabulation: V1 RACE
By R6 TRIAL REDUCTION OF MAX PENALTY
Page 2 of 2

R6→	Count / Row Pct	SUSPENDED	Row Total
V1			
WHITE		940	6364
		14.8	52.3
BLACK		1245	5813
		21.4	47.7
	Column	2185	12177
	Total	17.9	100.0

Number of Missing Observations = 0

APPENDIX E

SELECTION OF DISCRIMINANT ANALYSIS VARIABLES

E-1. INTRODUCTION. This appendix describes the the preliminary analysis conducted to select the variables to be included in the final discriminant analysis described in Chapter 5.

E-2. SELECTION PROCEDURE. The procedure considers, by FY, all (global) crimes and then these same crimes divided into the following crime categories.

a. Candidate Factors. The factors considered in the selection are the 5 numeric trial process factors (paragraph 3-4) and the 4 numeric soldier factors (paragraph 3-5). The factors are identified in the first column of Table E-1. The non-numeric (catgorical) factors characterizing the trial process (e.g. nature of charge, type of plea) are not linear variables and thus excluded from use in the discriminant analysis technique.

b. Factor Evaluation. Separate models were constructed for each factor for each fiscal year. Each model consists of one of selected variables acting alone. The Chi Square and TDP statistics generated by these model runs are shown in the Table E-1 by FY.

Table E-1. Individual FY Model Factor Statistics

MODEL FACTOR	FISCAL YEAR											
	FY 87		FY 88		FY 89		FY 90		FY 91		FY 92	
	P-VALUE	TDP%	P-VALUE	TDP%	P-VALUE	TDP%	P-VALUE	TDP%	P-VALUE	TDP%	P-VALUE	TDP%
SOLDIER Factors												
[illegible]	.00000	2.42	.00000	3.00	.00000	2.90	.00000	2.65	.00001	1.23	.00009	.93
[illegible]	.00000	2.07	.00000	2.60	.00000	1.60	.00000	1.63	.00000	1.31	.00244	.54
[illegible]	.01125	.23	.00007	.63	.00004	.70	.00017	.64	.00013	.87	.01871	.30
[illegible]	.00000	7.43	.00000	3.50	.00000	7.00	.00000	6.42	.00000	4.44	.00000	5.40
Trial Process Factors												
[illegible]	.01147	.23	.07720	.09	.31628	.00	.79560	.00	.66805	.00	.82493	.00
[illegible]	.01325	.22	.96301	.00	.45137	.00	.37499	.00	.25432	.00	.97633	.00
[illegible]	.07553	.09	.44457	.00	.35409	.00	.03002	.18	.69989	.00	.12236	.09
[illegible]	.05735	.11	.70361	.00	.35347	.00	.26491	.01	.01762	.30	.42559	.00
[illegible]	.01137	.23	.24943	.00	.46073	.00	.19770	.03	.26149	.00	.94222	.00

c. Factor Selection Criteria. The Chi Square and total discriminatry power (TDP) criteria described in Chapter 5 (paragraph 5-3) are used to evaluate the individual model runs and select the final model variables. Factors are selected from the model runs (paragraph E-2c) where the results meet the following numerical thresholds:

Chi Square: < 0.001

TDP: > 0.5 percent

The Chi Square threshold is set to what is a generally accepted level for significant results. To be considered a useful predictor, the factor value must meet this threshold, before consideration is given to the TDP value. The TDP threshold is set from inspection of table values. In general, the factors in the table fall into two categories: those with TDP values that are tend to be larger with nonzero values across the FY, and those with TDP values that tend to be smaller with zero values interspersed across the FY. Inclusion of factors with the smaller, zero-interspersed cases, while possibly offering some predictive power, will do so at the expense of factors with the larger values. In the interest of achieving the strongest predictive factors, the smaller, zero-interspersed values were to be excluded. The 0.5 percent TDP threshold is used as a convenient means to demark this boundary, and screen the potentially stronger from the potentially weaker predictive factors.

d. Factor Selection. Factors are selected by inspection of the the Table E-1 values. The values are compared with the criteria thresholds identifed in paragraph E-2c. Factors where both the P-values and the TDP values meet or exceed the thresholds in at least 4 of the 6 FY, are selected. The resultant factor selection is as follows:

- Age
- Service
- Education
- Score

It will be noted that all these factors are soldier factors. None of the factors associated with the trial process met the selection criteria.

APPENDIX F

TABLE OF OFFENSES

INTRODUCTION. This appendix displays the table used to preprocess the Clerk of Court data for use in the study. The table consists of a subset of the offenses in Appendix 12 of the Manual for Courts-Martial (MCM) (Ref 2) appropriate to charges faced by enlisted personnel. The table lists:

a. Offense. Identified by alphanumeric as given in the MCM.

b. Category. Identifies the category of the offense. The variable, as prepared for use in the study, and approved for use by the sponsor, takes on the values of:

MOR - Crime against military order
GOR - Crime against the general order
PER - Crime against a person(s)
PRO - Crime against property
SUB - Crime involving substances (distribution or abuse)

c. Maximum Sentence. Maximum period of confinement for the offense in months, as computed for use in the study from the maximum confinements in years and months given in the MCM.

d. Description. Brief indication of the nature of the offense and associated article from the MCM.

Offense	Category	Maximum sentence	Description (for ref only)
aa	MOR	36	a82 soliciting desertion
aa2	MOR	60	a82 soliciting desertion committed or attempted
ab	MOR	120	a82 soliciting mutiny
ab2	MOR	720	a82 soliciting mutiny committed or attempted
ac	MOR	120	a82 soliciting misbehavior before enemy
ac2	MOR	720	a82 solicit misbehavior before enemy cmtd or att
ad	MOR	120	a82 soliciting sedition
ad2	MOR	720	a82 solicited sedition committed or attempted
ah	MOR	24	a83 fraudulent enlistment or appointment
ah2	MOR	24	a83 fraud enlistment/appointment (soliciting)
aj	MOR	60	a83 fraudulent separation
am	MOR	60	a84 effect unlawful enlistment or appointment
an	MOR	60	a84 effect unlawful separation
aq	MOR	60	a85 desert w/int to avoid hazardous duty/svc
aq3	MOR	36	a85 desert w/int to avoid hazardous duty/svc/app
as	MOR	24	a85 desertion prior to acceptance of resignation
as3	MOR	24	a85 desertion prior to accept resig term by app
au	MOR	24	a85 desertion w/int to remain away permanently
au3	MOR	24	a85 desertion w/int to remain away perm/term/app
av	MOR	1	a86 fail to go, go from, place of duty
av3	MOR	1	a86 fail to go, go from, place of duty/appreh
aw	MOR	24	a85 attempted desertion
ax	MOR	1	a86 absence from unit, org., place of duty
ay	MOR	6	a86 absence from unit,etc., for less than 31 days
ay3	MOR	6	a86 absent/unit,etc., 30 days or less/apprehended
az	MOR	12	a86 absence from unit,etc., for more than 30 days
az3	MOR	18	a86 absent/unit, etc., more than 30 days/appreh
ba	MOR	3	a86 absence from guard, watch, duty section
bc	MOR	6	a86 absence w int avoid maneuv, field exercises
bf	MOR	24	a87 miss movement through design
bg	MOR	12	a87 miss movement through neglect
bj	MOR	12	a88 contempt toward officials
bl	MOR	12	a89 disrespect to superior commissioned officer
bn	MOR	120	a90 assault superior comm ofcr in exec of his ofc
bp	MOR	12	a91 strike or assault nco (except superior)
bq	MOR	3	a91 contempt or disrespect to other nco
br	MOR	60	a90 willfully disobey superior comm officer
bt	MOR	60	a91 strike or assault warrant officer
bu	MOR	36	a91 strike or assault superior nco
bv	MOR	24	a91 willfully disobey warrant officer
bw	MOR	12	a91 willfully disobey nco
bx	MOR	9	a91 contempt or disrespect to warrant officer
by	MOR	6	a91 contempt or disrespect to superior nco

Offense	Category	Maximum sentence	Description (for ref only)
ct	MOR	24	a92 relating to physical or information security
cu	MOR	24	a92 currency, cust duties/mil sales/ration
cu2	MOR	24	a92 currency, cust duties/mil sales/ration solict
cv	MOR	24	a92 relating to weapons
cw	MOR	24	a92 relating to personal relations among military
cx	MOR	24	a92 relating to vehicles, aircraft, vessels
cy	MOR	24	a92 relating to medical treatment
cz	MOR	24	a92 relating to off-limits establishments, areas
da	MOR	24	a92 relating to appearance, uniform
dc	MOR	24	a92 relating to use of gov prop or facilities
dd	MOR	24	a92 relating to alcohol
de	MOR	24	a92 relating to conflict of interest
df	MOR	3	a92 dereliction of duties through neglect
dj	MOR	72	a92 violate or fail to obey other lawful order
dk	MOR	6	a92 willful dereliction of duty
dl	SUB	24	a92 relating to drugs
dm	SUB	24	a112a wrgful dist of phenobarb & sch iv-v
dm4	SUB	24	a112a wrgful dist of phenobarb/sch iv-v *37e
dp	SUB	60	a112a pos w int to dist amp incl sch i - iii
dp4	SUB	60	a112a pos w int to dist amp incl sch i-iii *37e
dr	SUB	180	a112a wrgful mfg w int to dist amp incl sch i-iii
dr4	SUB	180	a112a wrgful mfg int to dist amp & sch i-iii *37e
dt	SUB	180	a112a wrgful intro w int dist amp incl sch i-iii
dt4	SUB	180	a112a wrgful intro int dist amp & sch i-iii *37e
dv	SUB	120	a112a pos w int to dist phenpbarb & sch iv-v
dv4	SUB	120	a112a pos w int dist phenobarb & sch iv-v *37e
dx	SUB	120	a112a wrgful mfg w int to dist phenobarb sch iv-v
dx4	SUB	120	a112a wrgful mfg int dist phenob & sch iv-v *37e
dz	SUB	120	a112a wrgful intro w int to dist phenob, sch iv-v
dz4	SUB	120	a112a wrgful intro int dist phenob, sch iv-v *37e
gl	GOR	12	a93 cruelty or maltreatment
gn	MOR	720	a94 mutiny
gp	MOR	720	a94 sedition
gq	MOR	0	a94 fail to prevent, supress or report mutiny
gr	MOR	0	a94 fail to prevent, supress or report sedition
gs	MOR	0	a94 attempted mutiny
gt	PER	12	a95 escape from post-trial confinement
gu	PER	12	a95 resisting apprehension
gv	PER	6	a95 breaking arrest
gw	PER	12	a95 escape from custody or confinement
gz	MOR	24	a96 releasing prisoner without authority

Offense	Category	Maximum sentence	Description (for ref only)
ha	MOR	24	a96 suffer prisoner to escape thru design
hb	MOR	12	a96 suffer prisoner to escape thru neglect
hd	MOR	36	a97 unlawful detention
he	PER	720	a134 kidnapping
hf	GOR	6	a98 unnecessary delay in disposing of case
hg	MOR	12	a98 fail to enforce or comply with ucmj
hj	MOR	720	a99 running away
hk	MOR	720	a99 shamefully abandoning, etc., command
hl	MOR	720	a99 endangering safety of command, etc.
hm	MOR	720	a99 casting away arms or ammunition
hn	MOR	720	a99 cowardly conduct
hp	MOR	720	a99 quitting place of duty to plunder or pillage
hq	MOR	720	a99 causing false alarms
hr	MOR	720	a99 willfully fail to do utmost to encount enemy
hs	MOR	720	a99 fail to afford relief and assistance
hu	MOR	720	a100 compel or attempt to compel surrender
hx	MOR	720	a101 improper use of countersign
hz	MOR	720	a102 forcing a safeguard
jc	MOR	60	a103 fail to secure,report, or deal captured prop
jh	MOR	720	a103 looting, pillaging
jk	MOR	720	a104 aiding the enemy
jm	MOR	0	a105 act w/o auth to detriment of another, etc.
jn	MOR	0	a105 maltreat prisoner while in posn of authority
jq	GOR	720	a106 spying
jr	GOR	0	a106a other cases of espionage
js	GOR	60	a107 false official statements
jt	GOR	0	a106a cases listed in art 106(a)(1)(a)-(d)
jw	PRO	120	a108 dispose of mil property exc/firearm, explo
jx	PRO	120	a108 selling or otherwise disposing of mil propty
ka	PRO	12	a108 negligently damaging (etc.) military property
kb	PRO	120	a108 disposed of firearm, explosive, or incend
kb2	PRO	120	a108 disposed of firearm, explos/incnd solicited
kc	PRO	120	a108 willful damage (etc.) firearm/explo/incndy
kd	PRO	120	a108 willful damage, etc., to military property
ke	MOR	120	a115 int self-inflict injury wartime/hostile zone
kf	PRO	120	a108 willful damage to mil prop/except firearm,
kh	PRO	60	a109 waste spoil etc prop other than mil prop
kh2	PRO	0	a109 solicit to waste, spoil,non-military prop
kj	MOR	36	a115 feign illness in wartime or hostl fire zone
kl	GOR	720	a110 improper hazarding of vessel
km	SUB	60	a111 drunk driving resulting in personal injury
kn	SUB	6	a111 drunken driving (w/o personal injury)
kp	PER	0	a111 reckless driving resulting in personl injury
kq	PER	0	a111 reckless driving (w/o personal injury)

Offense	Category	Maximum sentence	Description (for ref only)
ks	SUB	9	a112 drunk on duty
ku	MOR	120	a113 misbehavior of sentinel-pay iaw 37u.s.c.310
kv	MOR	12	a113 misbehav of sentinel (not war/hostile zone)
kw	MOR	720	a113 misbehavior of sentinel in time of war
kx	GOR	12	a114 dueling
ky	MOR	12	a115 feigned illness (not war/hostile zone)
kz	MOR	60	a115 intentnl self-injury (not war/hostile one)
lb	GOR	120	a116 riot
lc	PER	6	a116 breach of peace
ld	PER	6	a117 provoking speeches or gestures
le	PER	720	a118 premeditated murder
lf	PER	720	a118 unpremeditated murder
lg	PER	720	a118 kill while engaged in inherent dangerous act
lh	PER	720	a118 kill during commission of certain offenses
lk	PER	120	a119 voluntary manslaughter
ll	PER	36	a119 involuntary manslaughter
lp	PER	720	a120 rape
lq	PER	180	a120 carnal knowledge
lr	PRO	60	a121 larceny of military aircraft/vessel/vehicle
ls	PRO	60	a121 larceny of mil prop (not aircraft etc)
lt	PRO	60	a121 larceny of non-mil prop (not aircraft etc)
lt2	PRO	0	a121 solicit larceny all other cases
lu	PRO	60	a121 larceny of aircraft, vessel or vehicle
lv	PRO	60	a121 larceny of non-mil aircraft/vessel/vehicle
lw	PRO	6	a121 wrgful appropiation other cases
ly	PRO	24	a121 wrgful approp of aircraft vessel or vehicle
ma	PER	120	a122 robbery (other than with firearm)
mb	PRO	60	a123 forgery
mc	PRO	180	a122 robbery committed with a firearm
me	PRO	60	a123a make draw utter check, etc. insuff funds
mq	PER	84	a124 maiming
ms	PER	240	a125 sodomy with child under age of 16 years
mt	PER	240	a125 sodomy by force and without consent
mu	PER	60	a125 sodomy (other than forcible or w child < 16)
mu2	PER	0	a134 solicit sodomy all other cases
mw	PRO	240	a126 aggravated arson
mx	PRO	60	a126 arson, non-aggravated
na	PER	36	a127 extortion
nc	PER	3	a128 simple assault
nd	PER	36	a128 assault on comm officer not in exec of off
ne	PER	18	a128 assault on wo not in exec of off
nf	PER	6	a128 assault on nco not in execution of office

Offense	Category	Maximum sentence	Description (for ref only)
nh	PER	36	a128 assault sentinel/person perform law enforcmt
nj	PER	24	a128 assault/battery upon child under 16 years
nk	PER	3	a128 assault consummated by a battery
nl	PER	96	a128 aggrvtd assault committed/loaded irearm
nm	PER	60	a128 aggravated assault not with firearm
nz	GOR	4	a134 req, etc., comm of offense, wrgfl comm lang
pa	GOR	6	a134 jumping from vessel into water
pb	GOR	60	a132 make use false writ oath forged sig, etc.
pe	PRO	120	a129 burglary
pg	PRO	60	a130 housebreaking
pj	GOR	60	a131 giving false testimony
pk	GOR	60	a131 subscribing false statement
pl	GOR	60	a132 making or presenting false claim
pq	PRO	60	a132 pay amount less than called for by receipt
pt	PRO	60	a132 make receipt without knowledge of the facts
pv	PER	60	a134 prostitution
pv2	PER	0	a134 prostitution (soliciting)
qb	MOR	12	a133 conduct unbecom officer (not elsewhere)
qc	PER	3	a134 abusing public animal
qd	PER	12	a134 adultery
qe	PER	60	a134 assault, indecent
qf	PER	120	a134 assault w/intent to commit vol manslaughter
qg	PER	120	a134 assault with intent to commit robbery
qh	PER	120	a134 assault with intent to commit sodomy
qj	PER	120	a134 assault with intent to commit arson
qk	PER	120	a134 assault with intent to commit burglary
ql	PER	60	a134 assault with intent to commit housebreaking
qm	PER	240	a134 assault with intent to commit murder
qn	PER	240	a134 assault with intent to commit rape
qp	PER	24	a134 bigamy
qq	PRO	180	a134 bribery and graft
qq2	PRO	0	a134 bribery and graft (solicit)
qr	PRO	120	a134 burning with intent to defraud
qs	PRO	6	a134 check, worthless, making and uttering
qt	GOR	12	a134 correctional custody, offenses against
qw	PRO	6	a134 debt, dishonorably failing to pay
qx	MOR	36	a134 disloyal statements
qy	SUB	6	a134 disorderly conduct, drunkenness
rh	MOR	3	a134 drinking liquor with prisoner
rj	SUB	3	a134 drunkenness, incap f duties thru liqr, drugs
rl	SUB	3	a134 drunk prisoner
rx	SUB	0	a134 drugs, wrongful administration to another
ry	SUB	0	a134 drug paraphenalia, wrongful possession
rz	GOR	36	a134 false or unauth pass, permit, disch, id card

Offense	Category	Maximum sentence	Description (for ref only)
st	GOR	0	a134 false body fluid sample, presenting
su	GOR	60	a134 false pretenses, obtaining services under
sx	GOR	36	a134 false swearing
sy	GOR	3	a134 firearm, discharging through negligence
sz	GOR	12	a134 firearm discharge, willful life endangering
ta	PER	6	a134 fleeing scene of an accident
tb	MOR	3	a134 gambling with subordinates
tc	PER	12	a134 homicide, negligent
td	MOR	36	a134 impersonating commissioned officer, etc
tg	PER	84	a134 indecent act or liberties with child
th	PER	6	a134 indecent exposure
tj	PER	12	a134 indecent language
tl	PER	60	a134 indecent acts with another (except child)
tm	PRO	60	a134 mail, taking, opening, secreting, etc
tq	PRO	60	a134 mail, depositing, etc, obscene matters in
tr	MOR	36	a134 misprision of serious offense
tr2	MOR	0	a134 misprision of serious offense/solicit
ts	PER	0	a134 nuisance, committing
tt	PER	60	a134 obstructing justice
tu	PER	60	a134 pandering
tv	GOR	6	a134 violation of parole
tx	GOR	60	a134 perjury, subornation of
tz	GOR	36	a134 public record, altering, concealing, etc.
ua	GOR	6	a134 quarantine, breaking
ub	MOR	60	a134 testify, wrongfully refusing to
uc	MOR	1	a134 restriction, breaking
ud	MOR	3	a134 sentinel, disrespect to
ue	MOR	3	a134 sentinel, loiter or wrgfully sitting on post
ug	GOR	36	a134 stolen property, knowingly receiving, etc
uq	MOR	3	a134 straggling
ur	PER	36	a134 threat, communicating
ux	PRO	6	a134 unlawful entry
uy	GOR	12	a134 weapon, concealed, carrying
uz	GOR	6	a134 wearing unauthorized insignia, etc.
va	GOR	4	a134 cohabitation, wrongful
vc	GOR	0	a134 flag or anthem, disrespect to
ve	MOR	0	a134 salute, failure to render properly
vf	PRO	12	a134 seizure, destruct, removal, prop to prevent
vh	PER	0	a134 voyeurism
vn	GOR	60	a134 threat, bomb or bomb hoax
vp	PER	0	a134 minor, contributing to delinquency of
vq	PRO	0	a134 littering
vr	PER	0	a134 telephone calls, malicious or obscene
vt	MOR	24	a134 fraternization
vv	SUB	60	a112a wrongful use of marijuana

Offense	Category	Maximum sentence	Description (for ref only)
vv4	SUB	60	a112a wrongful use of marijuana *37e*
vx	SUB	60	a112a wrgful use amp incl sch i-iii ex mj
vx4	SUB	60	a112a wrgful use amp incl sch i-iii ex mj *37e*
vz	SUB	24	a112a wrgful use phenobarb & sch iv-v
vz4	SUB	24	a112a wrgful use phenobarb & sch iv-v *37e*
wa	PER	0	a134 18 u.s.c. 111 assault-certain US mil/emplys
wb	PRO	0	a134 18 u.s.c. 201 bribery and graft
wc	PER	0	a134 18 u.s.c. 241 civil rights
wd	PER	0	a134 18 u.s.c. 245 civil rights
we	PER	0	a134 18 u.s.c. 351 cong, albeit, superior ct ass
wf	PRO	0	a134 18 u.s.c. 471 counterfiting and forgery
wg	NA	0	a134 18 u.s.c. 783 ---------NA----------
wh	GOR	0	a134 18 u.s.c. 792 espionage/censorship offenses
wj	GOR	0	a134 18 u.s.c. 793 espionage/censorship offenses
wk	GOR	0	a134 18 u.s.c. 794 espionage/censorship offenses
wl	GOR	0	a134 18 u.s.c. 795 espionagecensorship offenses
wm	GOR	0	a134 18 u.s.c. 796 espionagecensorship offenses
wn	GOR	0	a134 18 u.s.c. 797 espionage/censorship offenses
wp	GOR	0	a134 18 u.s.c. 798 espionagecensorship offenses
wq	PER	0	a134 18 u.s.c. 871 extortion and threats
wr	GOR	0	a134 18 u.s.c. 1001 fraud and false statements
xv	PER	0	a134 18 u.s.c. 1201 kidnapping
ws	PER	0	a134 18 u.s.c. 1202 ransom money
wt	PRO	0	a134 18 u.s.c. 1341-1343 mail fraud
wu	PER	0	a134 18 u.s.c. 1461 obscenity
wv	GOR	0	a134 18 u.s.c. 1503 obstrctn of justice offenses
ww	GOR	0	a134 18 u.s.c. 1505 obstrctn of justice offenses
wx	GOR	0	a134 18 u.s.c. 1510 obstrctn of justice offenses
wy	PRO	0	a134 18 u.s.c. 1701 mail offenses
wz	PRO	0	a134 18 u.s.c. 1702 mail offenses
xa	PRO	0	a134 18 u.s.c. 1703 mail offenses
xb	PRO	0	a134 18 u.s.c. 1708 mail offenses
xc	PRO	0	a134 18 u.s.c. Ch. 83 postal service 1691-1738
xd	GOR	0	a134 18 u.s.c. 2071 record and reports
xe	PRO	0	a134 18 u.s.c. 2117 break/enter carrier facil
xf	PRO	0	a134 18 u.s.c. 2153 destruction of war material
xg	PRO	0	a134 18 u.s.c. 2155 destrtn of natl def material
xh	PRO	0	a134 18 u.s.c. 2312 transportn of stolen vehicle
xj	GOR	0	a134 18 u.s.c. 2387 treason, sedition, etc.
xk	GOR	0	a134 18 u.s.c. 2388 treason, sedition, etc.
xl	GOR	0	a134 18 u.s.c. 2511 wire tapping
xm	NA	0	a134 18 u.s.c. 5861 ----------NA----------
xq	SUB	24	a112a wrgful pos of mj less than 30 g
xq4	SUB	24	a112a wrgful pos of mj less than 30 g *37e*
xs	SUB	60	a112a pos mj 30g or more, amp incl sch i-iii

Offense	Category	Maximum sentence	Description (for ref only)
xs4	SUB	60	a112a pos mj 30g or more,amp incl sch i-iii *37e*
xu	SUB	24	a112a wrgful pos phenobarb & sch iv-v
xu4	SUB	24	a112a wrgful pos phenobarb & sch iv-v *37e*
xx	SUB	180	a112a wrgful mfg of amp incl sch i-iii
xx4	SUB	180	a112a wrgful mfg of amp incl sch i-iii *37e*
xy	GOR	0	a134 18 u.s.c. 13 motor vehicle violations
xz	SUB	0	a134 18 u.s.c. 13 alcohol control violations
ya	GOR	12	a134 18 u.s.c. 13 weapons violations
yb	PER	720	a134 18 u.s.c. 13 kidnapping
yc	PER	0	a134 18 u.s.c. 13 sex offenses
ye	SUB	120	a112a wrgful mfg w int dist phenob & sch iv-v
ye4	SUB	120	a112a wrgful mfg w int dist phenob & sch iv-v *37
yg	SUB	60	a112a wrgful intro amp incl sch i-iii
yg4	SUB	60	a112a wrgful intro amp incl sch i-iii *37e*
yj	SUB	120	a112a wrgful intro phenobarb & sch iv-v
yj4	SUB	120	a112a wrgful intro phenobarb & sch iv-v *37e*
yk	SUB	180	a112a wrgful dist of amp incl sch i-iii
yk2	SUB	0	a112a solicit wrgful dist of amp incl sch i-iii
yk4	SUB	180	a112a wrgful dist of amp incl sch i-iii *37e*
ym	SUB	180	a112a wrgful imp/exp amp incl sch i-iii
ym4	SUB	180	a112a wrgful imp/exp amp incl sch i-iii *37e*
yp	SUB	120	a112a wrgful imp/exp phenobarb & sch iv-v
yp4	SUB	120	a112a wrgful imp/exp phenobarb & sch iv-v *37e*
yy	SUB	0	a134 18 u.s.c. 13 drug control violations
z6	MOR	24	a92 viol genl orders or regulations not listed
z7	GOR	0	a134 other a134 offenses not listed
z8	GOR	0	a134 other violations of u.s.c. not listed
z9	GOR	0	a134 other state offenses not listed

APPENDIX G

TREATMENT DIFFERENCES WITH CONTROLS

G-1. INTRODUCTION. This appendix displays the results of the visual inspection of each of the three-way cross-tabulations carried out to determine the range (highest and lowest) values for the percentage difference in treatment, when the RACE alone (base case) results are controlled for GENDER, AGE, SERVICE, EDUCATION, and SCORE.

G-2. SIGN OF TREATMENT DIFFERENCE. The sign of the treatment difference may be either (+) or (-). The sign of the difference follows from the order in which race appears in the percentage difference computation which is:

DIFFERENCE = [WHITE PERCENT] - [BLACK PERCENT]

Thus, a positive (+) sign indicates overrepresentation in White cases, and a negative (-) signs indicates overrepresentation in Black cases.

G-3. FACTOR LEVEL CODES. The factor levels are reported using number codes for the levels involved. These numeric levels can be converted to descriptive labels using Tables G-1 and G-2. Table G-1 converts the SOLDIER factor (CNTRL) level codes, and Table G-2 converts the PROCESS (FACTR) level codes.

Table C-1. SOLDIER Factor Levels and Codes

Factor	Level code	Level description
GENDER	1	FEMALE
	2	MALE
AGE	1	18-19 YEARS
	2	20-21 YEARS
	3	22-23 YEARS
	4	24-25 YEARS
	5	26-27 YEARS
	6	28 OR MORE YEARS
SERVICE	1	LESS THAN 6 MOS
	2	6-11 MOS
	3	12-23 MOS
	4	24-47 MOS
	5	48-96 MOS
	6	96 OR MORE MOS
EDUCATION	1	SOME HIGH SCHOOL
	2	GED OR CERTIFICATE
	3	HIGH SCHOOL GRAD
	4	SOME COLLEGE
	5	COLLEGE GRAD
	6	POST GRAD
SCORE	1	BELOW 85
	2	85-94
	3	95-104
	4	105-114
	5	115 AND ABOVE

Table G-2. PROCESS Factor Levels and Codes
(page 1 of 2 pages)

Factor	Level code	Level description
Trial charge factors		
CHARGES	1	SINGLE OFFENSE
	2	2-4 OFFENSES
	3	5-7 OFFENSES
	4	8 OR MORE OFFENSES
TIME FACED	1	LESS THAN 5 YEARS
	2	5-10 YEARS
	3	10-15 YEARS
	4	15-20 YEARS
	5	20-25 YEARS
	6	MORE THAN 25 YEARS
NATURE	1	MILITARY ORDER
	2	GENERAL ORDER
	3	PERSON
	4	PROPERTY
	5	SUBSTANCE
Trial activity factors		
PLEA	1	NOT GUILTY
	2	GUILTY-CONTEST
	3	GUILTY
ARRANGEMENT	1	NONE
	2	STANDARD
	3	OTHER
TRIAL TYPE	1	BAD CONDUCT CM
	2	GENERAL CM
	3	SPECIAL CM
TRIAL BOARD	1	ENL & OFF
	2	MIL JUDGE
	3	OFFICERS

Table G-2. PROCESS Factor Levels and Codes
(page 2 of 2 pages)

Factor	Level code	Level description
Trial outcome factors		
CONFINEMENT	0	NONE
	1	LESS THAN 6 MOS
	2	6-12 MOS
	3	12-24 MOS
	4	24-48 MOS
	5	48-96 MOS
	6	96 OR MORE MOS
DISCHARGE	0	NONE
	1	BAD CONDUCT
	2	DISHONORABLE
CHARGE REDUCTION	1	NO REDUCTION
	2	UP TO 25%
	3	25-50%
	4	50-75%
	5	MORE THAN 75%
CONFINEMENT REDUCTION	1	NO REDUCTION
	2	UP TO 25%
	3	25-50%
	4	50-75%
	5	MORE THAN 75%
	6	SUSPENDED

G-4. TREATMENT DIFFERENCE ORGANIZATION. The treatment differences are organized into a set of tables (Tables G-3 to G-7). The tables identify the maximum and minimum differences for each factor in the base case and the associated factor and control level conditions as follows:

a. Process Factor. Name of PROCESS factor cross-tabulated with RACE.

b. Base Case Data. Data on the base case, for reference, as shown below:

(1) Common Mode. Number code (see Table G-3) for PROCESS factor level at which the common mode occurs in the base case and the percentage difference at this level (from Tables 4-2 to 4-4).

(2) Greatest Difference. Number code (see G-3) for PROCESS factor level at which the greatest percentage difference (excluding sign) occurs in the base case, and the magnitude, with sign, of this difference.

c. Base Case Controlled for Factor [name]. Data on each controlled case, as shown below:

(1) Common Mode. Number codes (see Table G-3) for the PROCESS factor level and control factor level at which common mode occurs in control case (the notation "all" is used to indicate that the common mode occurs at the same level at all levels of the control factor.

(2) Maximum Difference. Number code (see Table G-3) for the PROCESS factor level at which the greatest percentage difference (typically a positive value) occurs in the control case, and the magnitude, with sign, of this difference.

(3) Minimum Difference. Number code (see Table G-3) for the PROCESS factor level at which the least percentage difference (typically a negative value) occurs in control case and the magnitude, with sign, of this difference.

Table G-3. Treatment Difference Controlled for GENDER Factor

PROCESS FACTOR	BASE CASE				BASE CASE CONTROLLED FOR GENDER							
	COMMON MODE		GREATEST DIFF		COMMON MODE		MAXIMUM DIFFERENCE			MINIMUM DIFFERENCE		
	FACTR LEVEL	MODE DIFF	FACTR LEVEL	DIFF VALUE	FACTR LEVEL	CNTRL LEVEL	FACTR LEVEL	CNTRL LEVEL	DIFF VALUE	FACTR LEVEL	CNTRL LEVEL	DIFF VALUE
TRIAL CHARGES												
CHARGES	2	+0.4	4	-1.3	2	(all)	1	1	+5.5	3	1	-5.3
TIME FACED	2	-1.5	5	+1.8	2	(all)	6	1	+2.5	1	1	-4.3
NATURE	2	+4.1	3	-4.5	2	(all)	2	1	+6.0	5	1	-7.4
TRIAL ACTIVITY												
PLEA	3	+13.6	3	+13.6	3	(all)	3	2	+13.5	1	1	-11.8
ARRANGEMENT	2	+8.1	1	-13.3	2	(all)	3	1	+11.2	1	1	-14.3
TRIAL TYPE	2	+1.2	3	-2.0	2	(all)	2	1	+17.3	1	1	-10.4
TRIAL BOARD	2	+6.2	1	-6.4	2	(all)	3	1	+7.5	1	1	-5.8
TRIAL OUTCOME												
CONFINEMENT	1	+4.6	1	+4.6	1	(all)	3	1	+8.0	1	1	-10.2
DISCHARGE	1	+4.7	1	+4.7	1	(all)	1	1	+5.6	0	1	-7.7
CHARGE REDUCTION	1	+1.1	1	+1.1	1	(all)	3	1	+2.2	1	1	-2.7
CONFINEMENT REDUCTION	5	+6.3	6	-6.6	5	(all)	3	2	+6.0	5	1	-10.2

Table G-4. Treatment Difference Controlled for AGE Factor

PROCESS FACTOR	BASE CASE				BASE CASE CONTROLLED FOR AGE							
	COMMON MODE		GREATEST DIFF		COMMON MODE		MAXIMUM DIFFERENCE			MINIMUM DIFFERENCE		
	FACTR LEVEL	MODE DIFF	FACTR LEVEL	DIFF VALUE	FACTR LEVEL	CNTRL LEVEL	FACTR LEVEL	CNTRL LEVEL	DIFF VALUE	FACTR LEVEL	CNTRL LEVEL	DIFF VALUE
TRIAL CHARGES												
CHARGES	2	+0.4	4	-1.3	2 (all)		2	5	+6.7	3	5	-7.8
TIME FACED	2	-1.5	5	+1.8	2 (all)		2	5	+5.0	6	5	-4.8
NATURE	2	+4.1	3	-4.5	2 (all)		1	1	+14.0	3	1	-12.1
TRIAL ACTIVITY												
PLEA	3	+13.6	3	+13.6	3 (all)		3	4	+13.8	1	4	-12.7
ARRANGEMENT	2	+8.1	1	-13.3	2 (all)		2	4	+8.5	1	4	-11.9
TRIAL TYPE	2	+1.2	3	-2.0	2 (all)		2	6	+10.7	2	1	-5.4
TRIAL BOARD	2	+6.2	1	-6.4	2 (all)		2	2	+5.5	1	3	-16.1
TRIAL OUTCOME												
CONFINEMENT	1	+4.6	1	+4.6	1 (all)		2	5	+9.1	5	5	-4.2
DISCHARGE	1	+4.7	1	+4.7	1 (all)		2	5	+10.4	2	5	-6.6
CHARGE REDUCTION	1	+1.1	1	+1.1	1 (all)		0	3	+4.1	4	4	-2.2
CONFINEMENT REDUCTION	5	+6.3	6	-6.6	5 (all)		4	2	+4.0	5	5	-3.8

Table G-5. Treatment Difference Controlled for SERVICE Factor

	BASE CASE				BASE CASE CONTROLLED FOR SERVICE							
PROCESS FACTOR	COMMON MODE		GREATEST DIFF		COMMON MODE		MAXIMUM DIFFERENCE			MINIMUM DIFFERENCE		
	FACTR LEVEL	MODE DIFF	FACTR LEVEL	DIFF VALUE	FACTR LEVEL	CNTRL LEVEL	FACTR LEVEL	CNTRL LEVEL	DIFF VALUE	FACTR LEVEL	CNTRL LEVEL	DIFF VALUE
TRIAL CHARGES												
CHARGES	2	+0.4	4	-1.3	2 (all)		2	1	+10.1	4	6	-9.8
TIME FACED	2	-1.5	5	+1.8	2 (all)		4	1	+4.4	1	1	-3.7
NATURE	2	+4.1	3	-4.5	2 (all)		1	4	+11.3	3	3	-9.9
TRIAL ACTIVITY												
PLEA	3	+13.6	3	+13.6	3 (all)		3	6	+12.0	1	6	-12.3
ARRANGEMENT	2	+8.1	1	-13.3	2 (all)		2	6	+7.1	1	6	-11.5
TRIAL TYPE	2	+1.2	3	-2.0	2 (all)		1	2	+9.6	2	2	-8.3
TRIAL BOARD	2	+6.2	1	-6.4	2 (all)		2	2	+6.5	2	1	-7.0
TRIAL OUTCOME												
CONFINEMENT	1	+4.6	1	+4.6	1 (all)		1	1	+9.4	3	1	-6.9
DISCHARGE	1	+4.7	1	+4.7	1 (all)		2	6	+6.8	2	2	-6.0
CHARGE REDUCTION	1	+1.1	1	+1.1	1 (all)		1	1	+6.4	0	1	-5.1
CONFINEMENT REDUCTION	5	+6.3	6	-6.6	5 (all)		4	4	+5.5	5	6	-4.4

Table G-6. Treatment Difference Controlled for EDUCATION Factor

PROCESS FACTOR	BASE CASE				BASE CASE CONTROLLED FOR EDUCATION							
	COMMON MODE		GREATEST DIFF		COMMON MODE		MAXIMUM DIFFERENCE			MINIMUM DIFFERENCE		
	FACTR LEVEL	MODE DIFF	FACTR LEVEL	DIFF VALUE	FACTR LEVEL	CNTRL LEVEL	FACTR LEVEL	CNTRL LEVEL	DIFF VALUE	FACTR LEVEL	CNTRL LEVEL	DIFF VALUE
TRIAL CHARGES												
CHARGES	2	+0.4	4	-1.3	2 (all)		1	1	+4.4	4	1	-4.7
TIME FACED	2	-1.5	5	+1.8	2 (all)		5	1	+6.7	1	4	-5.2
NATURE	2	+4.1	3	-4.5	2 (all)		1	1	+10.2	1	1	-8.4
TRIAL ACTIVITY												
PLEA	3	+13.6	3	+13.6	3 (all)		3	3	+13.9	6	6	-23.8
ARRANGEMENT	2	+8.1	1	-13.3	2 (all)		2	4	+11.7	3	3	-13.5
TRIAL TYPE	2	+1.2	3	-2.0	2 (all)		2	4	+8.7	1	4	-6.6
TRIAL BOARD	2	+6.2	1	-6.4	2 (all)		2	1	+9.3	1	1	-8.1
TRIAL OUTCOME												
CONFINEMENT	1	+4.6	1	+4.6	1 (all)		1	1	+14.6	4	6	-17.5
DISCHARGE	1	+4.7	1	+4.7	1 (all)		1	1	+11.6	0	6	-16.9
CHARGE REDUCTION	1	+1.1	1	+1.1	1 (all)		0	2	+2.7	1	1	-2.7
CONFINEMENT REDUCTION	5	+6.3	6	-6.6	5 (all)		4	1	+9.9	5	6	-16.7

Table G-7. Treatment Difference Controlled for SCORE Factor

	BASE CASE						BASE CASE CONTROLLED FOR SCORE					
PROCESS FACTOR	COMMON MODE		GREATEST DIFF		COMMON MODE		MAXIMUM DIFFERENCE			MINIMUM DIFFERENCE		
	FACTR LEVEL	MODE DIFF	FACTR LEVEL	DIFF VALUE	FACTR LEVEL	CNTRL LEVEL	FACTR LEVEL	CNTRL LEVEL	DIFF VALUE	FACTR LEVEL	CNTRL LEVEL	DIFF VALUE
TRIAL CHARGES												
CHARGES	2	+0.4	4	-1.3	2 (all)		1	1	+6.3	4	1	-5.6
TIME FACED	2	-1.5	5	+1.8	2 (all)		4	1	+7.1	3	1	-7.2
NATURE	2	+4.1	3	-4.5	2 (all)		1	1	+11.9	3	1	-8.1
TRIAL ACTIVITY												
PLEA	3	+13.6	3	+13.6	3 (all)		3	5	+19.7	1	5	-18.6
ARRANGEMENT	2	+8.1	1	-13.3	2 (all)		2	5	+13.4	1	5	-20.7
TRIAL TYPE	2	+1.2	3	-2.0	2 (all)		2	5	+6.6	2	2	-4.4
TRIAL BOARD	2	+6.2	1	-6.4	2 (all)		2	3	+9.8	1	3	-8.4
TRIAL OUTCOME												
CONFINEMENT	1	+4.6	1	-6.6	1 (all)		1	4	+8.8	0	5	-15.2
DISCHARGE	1	+4.7	1	+4.7	1 (all)		1	5	+7.8	0	5	-7.3
CHARGE REDUCTION	1	+1.1	1	+1.1	1 (all)		0	2	+3.0	4	3	-15.2
CONFINEMENT REDUCTION	5	+6.3	6	-6.6	5 (all)		4	5	+14.3	5	5	-15.2

APPENDIX H

ASSESSMENT USING TREE-STRUCTURED ANALYSIS

INTRODUCTION. This appendix contains a reproduction of the (unpublished) report, A Tree-structured Analysis of the ETAJUP Data, prepared by Dr. Wei-Yin Loh of the University of Wisconsin. CAA is indebted to Dr. Gerald H. Andersen of the Army Research Office (ARO) for suggesting the potential value of the work and then arranging with Dr. Loh, a consultant to ARO, to apply his recently developed generalized discriminant analysis methodology to the study data. The work performed, as reported herein and cited in the main report, provides insights in support of the traditional discriminant analysis methodology used in the study. The study sponsor was consulted and agreed to the release of the study data to Dr. Loh solely for study purposes, with no further dissemination.

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A Tree-structured Analysis of the ETAJUP Data

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October 4, 1993

1 Introduction

This report gives the results of applying a tree-structured classification program to the ETAJUP data for each of the years 1987–92.

Tree-structured classification is a statistical method for identifying which explanatory factors affect the membership of a group factor. The group factor in this case is the race of a soldier. The result is displayed as a decision tree with a condition attached to each non-terminal node. The data set used to construct the tree is called the "training set." If available, a separate data set called a "test set" can be used to assess the classification error of the tree.

Figure 1 shows the classification tree constructed from a training data set consisting of the 1987 court martial cases. The top node is associated with the condition "score $\leq$ 99." This means that if a soldier has a GT score of less than 99, then he or she would be channeled down the right side into node 3. Otherwise, the soldier goes left into node 2. A classification ("Black" or "White") is given at each terminal node of the tree. Also given are the numbers of black and white soldiers in the training set in each terminal node.

The earliest classification tree method was the THAID algorithm developed at the University of Michigan in the 1960's (Morgan and Sonquist 1963, Morgan and Messenger 1973). Since then, more advanced methods have been developed, including the CART method of Breiman, Friedman, Olshen and Stone (1984) and the FACT method of Loh and Vanichsetakul (1988). The present analysis uses a method developed in Shih (1993) called PACT that is an improvement over FACT.

All classification algorithms attempt to search for the best partition of the training data at each node so that the split produces subnodes that are much purer (in terms of group membership) than the node being split. This is similar to discriminant analysis, except that only one factor is used at a time and the procedure is applied in a recursive fashion. A technique of cross-validation pruning is often used to determine the final size of the decision tree. Its purpose is to avoid either under- or oversplitting of the nodes. In terms of classification accuracy, a tree-structured method is usually as efficient as discriminant analysis, although the former can adapt to nonlinear patterns more easily than the latter. The main differences between tree-structured classification and discriminant analysis are:

1. Non-numeric factors (such as type of trial board) can be included in a tree-structured analysis as easily as numeric factors (such as age of a soldier). Discriminant analysis cannot deal with non-numeric factors.

2. The result can be displayed and interpreted as a decision tree.

2 Results of the analyses

Ninety-three of the 12,177 cases over the six years were dropped from the analysis because they had negative values for either age or length of service of the soldier. An analysis by year was carried out because it has the following advantages:

1. The decision trees can be compared to check for stability across years.
2. Data from other years can be employed as test data sets to estimate the misclassification rates of the tree classifiers.

The calculations were performed on a DEC 3000 300 workstation and a DECstation 5000.

Figures 1-6 present the classification trees for each year. The six trees are very similar. All show that the soldier factor, GT score, is most discriminating, with black soldiers tending to have lower GT scores than white soldiers. Other factors that tend to separate black from white soldiers are age (black soldiers tend to be older), years of service (black soldiers tend to have longer years of service), and to a lesser degree, type of plea (white soldiers tend to plead guilty more often than black soldiers). The other factors do not seem to be important. These results agree with those in Table 4-3 of the CAA-MR-93-43 report.

Table 1 compares the estimated misclassification rates for the tree-structured method against two standard methods: discriminant analysis and five-nearest neighbor analysis (the latter two were obtained with the SAS program using only numeric factors). The error rates are all between 33-38%. Two conclusions may be drawn from this:

1. In terms of accuracy, the tree structured method is performing as well as any of the standard methods.
2. The high error rates suggest that the explanatory factors in the data are not very informative for discriminating between races. This conclusion agrees with that reached in section 6.4 of CAA-MR-93-43.

3 Conclusion

The overall conclusion from this study is that the race of a soldier in the justice system is predominantly determined by factors such as GT score, age and years of service (in that order). The only trial factors that have any effect are type of plea and plea bargain. The strength of the evidence in these two factors is rather weak, however.

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Loh, W. Y. and Vanichsetakul, N. (1988). Tree-structured classification via generalized discriminant analysis (with discussion). *Journal of the American Statistical Association* 83, 715-728.

Morgan, J. A. and Messenger, R. C. (1973). *THAID: A sequential analysis program for the analysis of nominal scale dependent variables*. Technical report, Institute for Social Research, University of Michigan, Ann Arbor.

Table 1 Estimates of classification error rates for discriminant analysis, 5-nearest neighbor and tree classifier for each year using another year as test data

Training set	Test set	Discriminant analysis	Nearest neighbor	Classification tree
1987	1988	0 33	0 37	0 32
1988	1989	0 34	0 37	0 33
1989	1990	0 33	0 36	0 34
1990	1991	0 32	0 38	0 33
1991	1992	0 38	0 37	0 36
1992	1987	0 35	0 36	0 38

Morgan, J. A. and Sonquist, J. N. (1963) Problems in the analysis of survey data, *Journal of the American Statistical Association* **58**, 415-434.

[illegible] (1993) *Tree-structured Classification*, PhD thesis, Department of Statistics, University of [illegible], Madison.

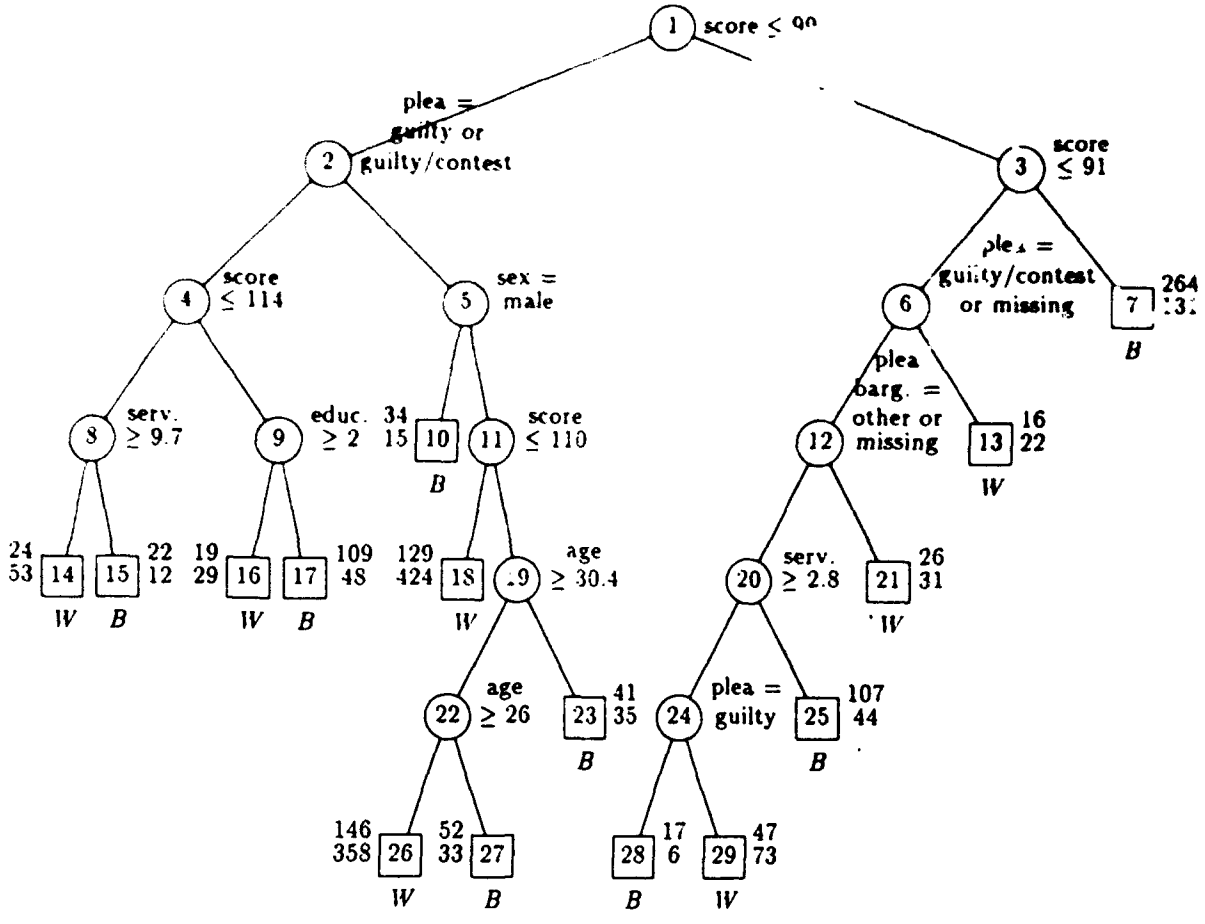

Figure 1: 1987 data. At each non-terminal node, a case goes to the right descendant node if the associated condition is satisfied; otherwise it goes to the left descendant node. Numbers of black (top) and white (bottom) cases are given beside each terminal node.

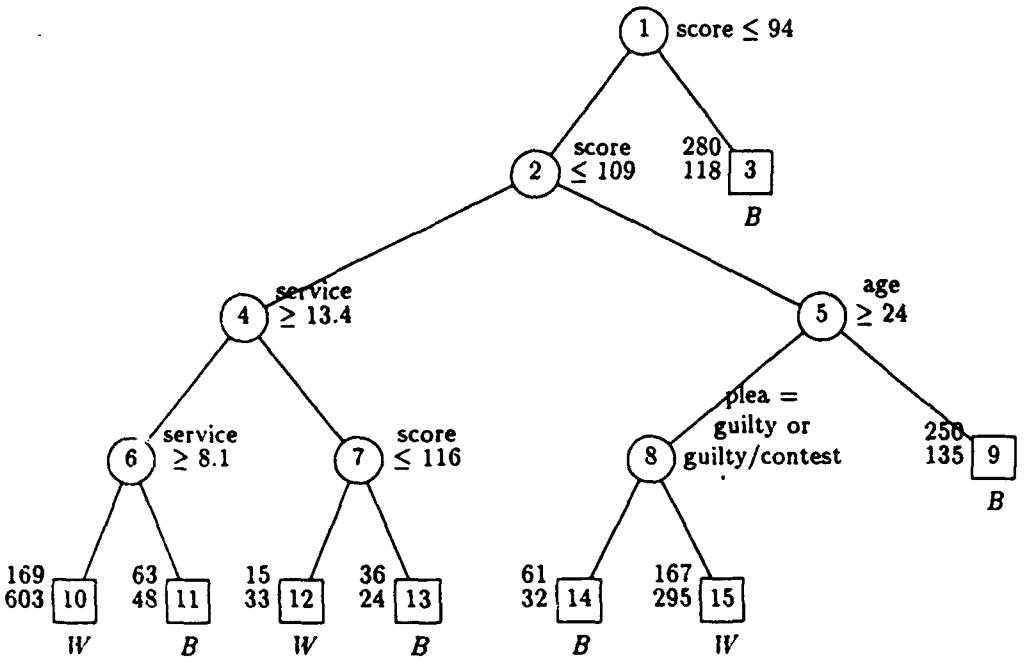

Figure 2: 1988 data. At each non-terminal node, a case goes to the right descendant node if the associated condition is satisfied; otherwise it goes to the left descendant node. Numbers of black (top) and white (bottom) cases are given beside each terminal node.

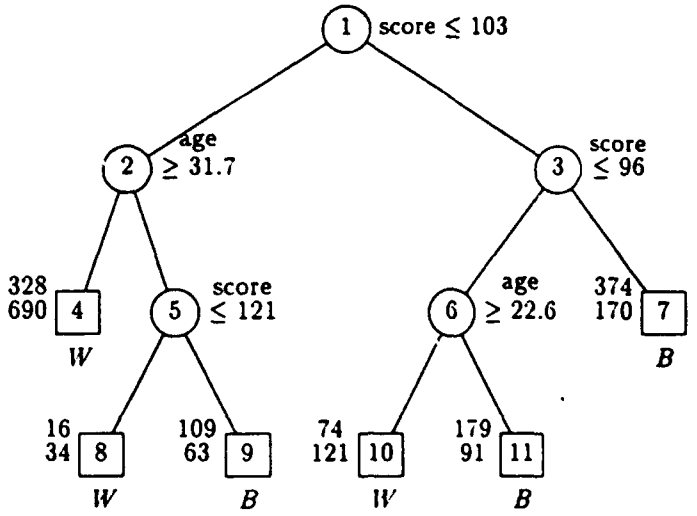

Figure 3: 1989 data. At each non-terminal node, a case goes to the right descendant node if the associated condition is satisfied; otherwise it goes to the left descendant node. Numbers of black (top) and white (bottom) cases are given beside each terminal node.

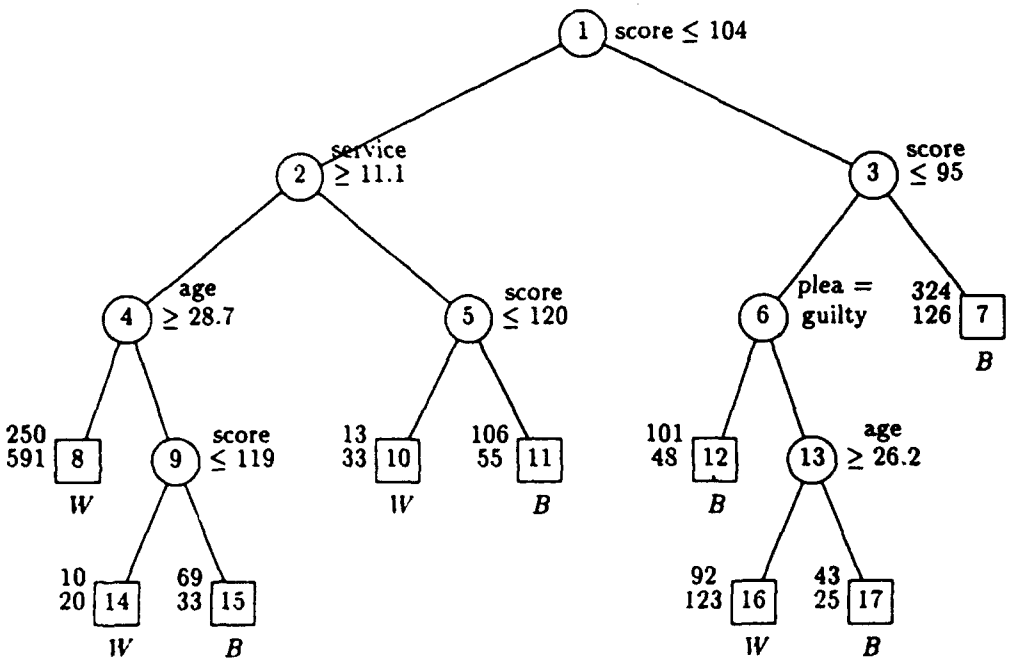

Figure 4: 1990 data. At each non-terminal node, a case goes to the right descendant node if the associated condition is satisfied; otherwise it goes to the left descendant node. Numbers of black (top) and white (bottom) cases are given beside each terminal node.

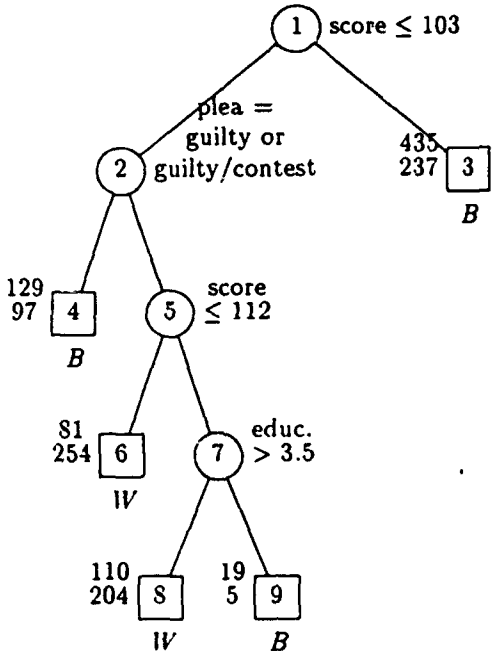

Figure 5: 1991 data. At each non-terminal node, a case goes to the right descendant node if the associated condition is satisfied; otherwise it goes to the left descendant node. Numbers of black (top) and white (bottom) cases are given beside each terminal node.

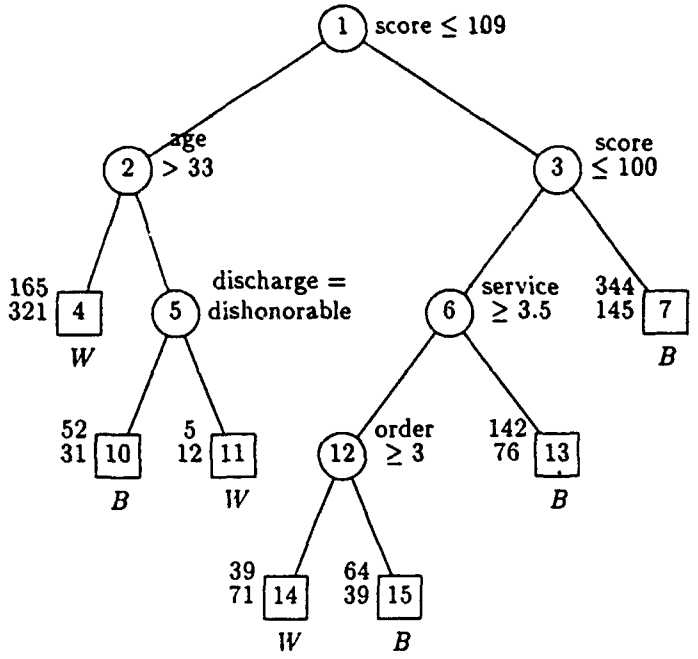

Figure 6: 1992 data. At each non-terminal node, a case goes to the right descendant node if the associated condition is satisfied; otherwise it goes to the left descendant node. Numbers of black (top) and white (bottom) cases are given beside each terminal node.

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11 October 1993

Mr. James J. Connelly
CSCA-FSLP
US Army Concepts Analysis Agency
8120 Woodmont Avenue
Bethesda, Maryland 20814-2797

Dear Mr. Connelly:

Enclosed please find a classification tree based on 3,021 cases or 25% of the whole 1987-92 ETAJUP database. Unfortunately, the physical memory of my computer does not allow my program to analyze a bigger subset. This subset was obtained by selecting every fourth case, after deletion of cases with missing values in age and years of service.

The structure of the tree is very similar to those for individual years reported to you earlier. The dominant factors are GT score, service, and age of soldier.

The misclassification error rate of the tree estimated from the remaining 75% of the database is 35%. This is about the same as the error rates for the analyses by year. The corresponding error rates for linear discriminant analysis and five-nearest neighbor analysis from the SAS package are 34% and 37%, respectively. This shows again that it is hard to improve the error rates by much.

If you have any questions, I'll be glad to answer them.

Sincerely,

Wei-Yin Loh

Wei-Yin Loh

encl: Tree diagram

cc: Gerald R. Andersen

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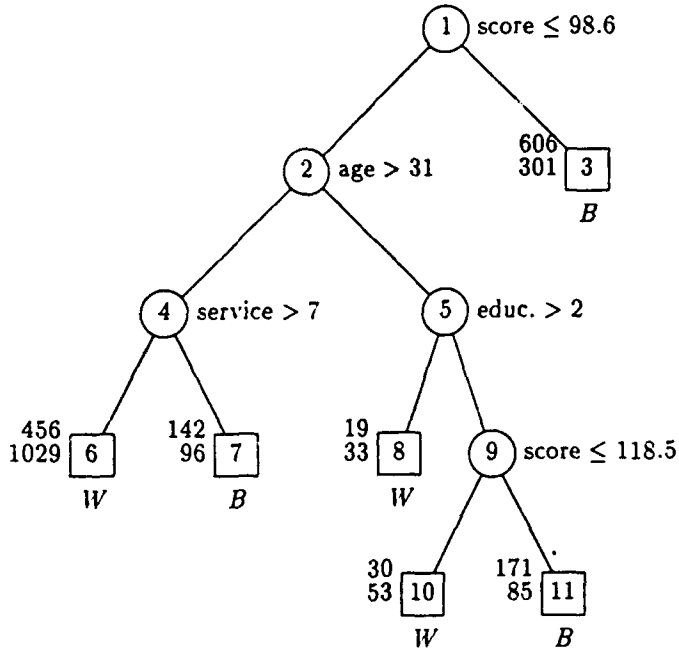

Figure 1: Decision tree constructed from 3,021 cases (25% of 1987-92 data). At each non-terminal node, a case goes to the right descendant node if the associated condition is satisfied; otherwise it goes to the left descendant node. Numbers of black (top) and white (bottom) cases are given beside each terminal node. Estimated misclassification error rate for the tree based on remaining 9,063 cases (75% of the 1987-92 data) is 35%. Corresponding estimated error rates for linear discriminant analysis and 5-nearest neighbor analysis using only the numeric factors are 34% and 37%, respectively.

APPENDIX I

DISTRIBUTION

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GLOSSARY

ABBREVIATIONS, ACRONYMS, AND SHORT TERMS

AR	Army regulation
ARO	Army Research Office
BCD	bad conduct discharge
CAA	US Army Concepts Analysis Agency
CM	common mode
CMCR	Court-martial Case Records
DA	Department of the Army
FY	fiscal year
GT	General Technical (test)
MCM	Manual for Courts-Martial
SPSS	Statistical Package for the Social Services
TDP	total discriminatory power
UCMJ	Uniform Code of Military Justice
UP	under the provisions of